MAY 2 6 1930

QST

DEVOTED ENTIRELY TO

AMATEUR RADIO

BLISHED SINCE 1915 BY THE AMERICAN RADIO RELAY LEAGUE INC.

UNE, 1930

25c

HAS YOUR HANDBOOK A BLUE COVER?

If not, it isn't the modern Sixth Edition and you're missing a lot

Each successive edition of the Handbook has been revised, hot modern material substituted for the practices that have been outgrown. The Sixth Edition has information on Crystal Control and Radiotelephony that did not appear in previous editions, in addition to everything else that the A.R.R.L. can think of for the guidance of a practical radio amateur.

Good as the editions were with the brown and the green covers, they are only QSA1 by comparison with

The Sixth Edition

THE RADIO AMATEUR'S HANDBOOK

By Handy & Hull

NOW IN ITS SEVENTY-FIFTH THOUSAND

This book is a publication of the American Radio Relay League, the amateur's own organization, written by amateurs for amateurs. It is hailed everywhere as the greatest help that an amateur ever saw. ¶ Because it starts in the very beginning of the story and tells what amateur radio is, how to become an amateur, how to learn the code and how to operate a simple station, it is invaluable and a sympathetic guide for the beginner. ¶ Because it progresses through working descriptions and building instructions for many varieties of receivers, transmitters, power supplies and antennas, and because it goes into all the intricacies of station operation and message handling, it is an indispensable necessity for the proficient amateur.

A world of valuable information, printed in "QST" format and bound in durable paper covers so that the price may be modest.

Blue-and-Gold Paper Cover, $1.00 *Stiff Buckram Binding, $2*

We honestly don't see how you can get along without the Handbook. Order yours to-day!

American Radio Relay League, Hartford, Conn., U. S. A.

QST

The Official Organ of the A.R.R.L.

VOLUME XIV | JUNE, 1930 | NUMBER 6

Editorials		7
Time Signals From W9XAM		8
Radio Manufacturers' Convention		8
Getting That D. C. Plate Supply	*George Grammer*	9
The Band-box Superhet	*Howard F. Anderson*	17
Advanced Transmitter Design	*James J. Lamb*	21
More Progress on 28 Megacycles	*Clark C. Rodimon*	29
Experimenters' Section		33
I.A.R.U. News		34
Communications Department		35
Calls Heard		51
Correspondence Department		52
Atlantic Division Convention		66
Financial Statement		68
Angus Elected Central Division Director		84
Doings at Headquarters		86
Silent Keys		86
Ham-ads and QRA's		91
QST's Index of Advertisers		94

QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A.
Official Organ of the A.R.R.L. and the International Amateur Radio Union

Kenneth B. Warner (Secretary, A.R.R.L.), *Editor-in-Chief and Business Manager*

James J. Lamb, *Technical Editor* | George Grammer, *Assistant Technical Editor* | Clark C. Rodimon, *Managing Editor*

David H. Houghton, *Circulation Manager* | G. Donald Meserve, *Advertising Manager*

Advertising Offices.....55 West 42d Street, New York City
Editorial Offices.....1711 Park Street, Hartford

Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, $2.50 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, $3.00 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

Copyright 1930 by the American Radio Relay League, Inc. Title registered at United States Patent Office.

The air is full of pictures!

There's many a thrill in television! A thousand times as many as the first radio listeners ever had through headphones! And bigger, better, more interesting, more entertaining radio-vision programs are coming! ¶ Television is getting ahead. Join with us in its development. Help us bring television to the point of final achievement.

You can quickly build your own

JENKINS

RADIOVISOR

MANY of you built the earlier Jenkins Radiovisor, with its cardboard disc and ordinary motor drive. Now there is a new, improved kit. It has Faraday eddy current motor; simple framing by means of adjustable lamp-house; accurately drilled scanning disc, mounted on ball bearings; simple speed control and synchronous operation; magnifying lens as optional equipment. Just the job to receive those 48-line, 15-pictures-per-second signals. Remember — Radio-vision programs are regularly transmitted by Jenkins station W2XCR, at Jersey City, N. J., and W3XK, at Washington, D. C. and others. ¶ A few hours' fascinating work, and there's your kit, all assembled. If you prefer a complete Radiovisor, assembled, wired and ready to run, you will want our Model 100 Radiovisor with cast metal base. ¶ Invite your friends to see radio-vision programs. Their enthusiasm will help develop this new scientific wonder.

WRITE FOR COMPLETE DATA — NOW!

... on the Jenkins Radiovisor Kit No. 1, and on the completely assembled Model 100 and Cabinet Model 200. Also ask for literature on radio-vision receivers, television lamps, photo-electric cells and other equipment.

JENKINS TELEVISION CORPORATION
346-370 Claremont Avenue
JERSEY CITY, N. J.

Say You Saw It in *QST* — It Identifies You and Helps *QST*

EDITORIALS

THE British amateur societies have an idea which, it seems to us, our clubs might employ with profit. During the pleasant summer weather each club seems to have a "field day" or outing, and of course, being radio amateurs, the field day is distinctly of a radio complexion. It amounts, in fact, to a kind of radio "treasure hunt."

In the usual case of this kind, in preparation for the field day a competent committee is appointed to assemble and install a low-powered transmitter in an unknown location within, say, twenty miles of the home town. The station is very carefully concealed, hidden in a farmer's barn, or even in a culvert, or camouflaged if necessary, and its location and direction kept profound secrets. The individual members of the society, singly or in teams of two, equip themselves with portable receivers and loop antennas. On the appointed day they set out separately from their homes, in autos and side-cars, to find the unknown station, which transmits periodically throughout the day on schedule. A bearing is taken and the car proceeds in the general direction, stops and sets up for another shot on the next schedule, and so on, leisurely making its away across pleasant country, enjoying the scenery and perhaps picnicking enroute. When the general location of the transmitter is reached the chase frequently becomes exciting, particularly if there are several parties hot on the scent, because then it becomes a case of actually finding the apparatus. Sometimes it is hidden in a clump of woods just a few yards away and yet remains undetected for hours. The team that first finds it wins the race and the solid gold variable condenser if any.

It sounds as if it were great sport. The transmitter location of course becomes the rendezvous for "eats," sports, and so on. It may be necessary, at some appointed hour, to broadcast the location in plain language to missing searchers who have become lost, strayed or stolen. If their receivers break down and they miss the broadcast, it is just too bad but they have to go back home for supper.

Much depends upon the skill and ingenuity of the transmitter committee, of course. In our country it seems that a frequency in the 1715–2000 band would be the best to use, both with respect to the transmitting distance and to make loop reception more feasible. Unless a member of the committee has a portable license it will also mean business with the Supervisor, either to take out a license for the chosen location or to get special authority for the one day's operation. Plenty of original ideas will occur to the clubs.

With summer at hand, a season in which it normally is difficult to maintain club interest, it seems to us that this idea might well be taken up by our American clubs. *QST* would like to hear the results from any club that tries it.

EVERY amateur who has written us concerning our recent editorial efforts to make amateurs frequency-conscious and minimize out-of-band operation praises our endeavor, but most of them go on to say that it wouldn't be a bad idea to mention commercial interference in our bands, which is pretty fierce sometimes.

Of course. The commercial skirts are far from clean themselves. Proportionately we're not sure that they're particularly better than we are. But our thought is that *everybody* must be right on this important subject and that the rest of the world is improving rapidly, whereupon it is up to us to be certain that our own house is put in order promptly. The German station DHE, long a thorn in our 7000-band, has been moved out, largely as the result of a protest which the Radio Society of Great Britain filed with its govern-

ment. A few months ago Canada chased two infringing commercials out of our 14,000-band upon complaint by our Canadian General Manager. Our bands are guaranteed to us by treaty and we can always obtain action from the ratifying nations. By the same token, other people's bands are guaranteed to them and they expect protection too. There is pretty much of a spirit of give and take right now, as the radio world buckles down to the serious job of putting everything exactly where it belongs, but it's our duty here at Headquarters to tell you fellows everywhere that the world is moving rapidly now to standards of much greater precision, to much smaller tolerances, and to the general feeling that stations that can't play the game and keep out of trouble have no right to expect to operate in the crowded ether of to-day and to-morrow.

There are folks who don't think we're very important, anyway, and it takes a lot of talking to keep them convinced. The task will be infinitely easier if we can show that we stay where we are assigned. It may become impossible if we don't. That is why it is very important that we amateurs be in the clear.

K. B. W.

Strays

Time Signals from W9XAM

Many amateurs will remember the time signals transmitted by WNBT, the station of the Elgin National Watch Company, Elgin, Ill., a few years ago. The limited commercial license was cancelled last June, but the company has recently obtained an experimental license for resuming these transmissions, under the call W9XAM. The frequency is 4795 kc. A crystal-controlled transmitter with an output of 500 watts is used.

Present schedules are as follows:

7:55 a.m. — 8:00 a.m.,	C.S.T., daily except Sunday
9:55 a.m. — 10:00 a.m.,	C.S.T., daily except Sunday
11:55 a.m. — 12:00 Noon,	C.S.T., daily except Sunday
1:55 p.m. — 2:00 p.m.,	C.S.T., daily except Saturday and Sunday
3:55 p.m. — 4:00 p.m.,	C.S.T., daily except Saturday and Sunday
5:55 p.m. — 6:00 p.m.,	C.S.T., daily except Saturday and Sunday
9:55 p.m. — 10:00 p.m.,	C.S.T., daily except Saturday and Sunday

Reports on the reception of these signals will be appreciated. They should be sent to the address given above.

Radio Manufacturers' Association Convention

The R. M. A. Convention and Trade Show will be held in the municipal auditorium at Atlantic City this year, during the entire week of June 2nd. The latest developments in broadcast receivers will be on display, together with new models being brought out by all the prominent manufacturers, as well as those just entering the field. Aside from the apparatus displays, however, this year's convention will be of unusual interest because there undoubtedly will be a great deal of discussion on the pentode and its relation to manufactured receivers during the coming year. It is not at all unlikely that the trend of circuit design will be influenced by the conclusions reached at the show.

Admission to the show will be by invitation only, and tickets may be obtained by writing the Radio Manufacturers' Association, 32 W. Randolph Street, Chicago. They are issued without charge.

A new shaving cream with the name "QSS" has just made its appearance on the market. W9AKN thinks the idea is that when the lather is applied the whiskers just fade out, thus eliminating the razor from the picture! If the people that make it had been more in step with the times they'd have called it QSC.

Here's a "hot" one picked up from a newspaper after the recent rebroadcast of the opening of the London naval conference:

"Just a few minutes before King George began the address which formally inaugurated the conference, a member of the control room staff of the CBS tripped over the wires to the generator that energizes the entire network. The chief control engineer grasped the wires together in his hands to restore the circuit. Leakage of the current through his body to the floor shook his arms with spasms, but he held on without a break for twenty minutes until new wires could be connected."

Seems as though even the broadcast people aren't free from the haywire complex.

W6ARV has a good way of drilling holes in glass. A finishing nail is placed in a breast drill or drill press, and the head of the nail is used as a lap. The compound employed is either valve-grinding compound which has no oil in it or simply carborundum mixed with water. It is advisable to use a small piece of board under the glass when drilling.

Getting That D.C. Plate Supply

A Résumé of the Practical Aspects of Rectifier and Filter Design

By George Grammer, *Assistant Technical Editor*

Quoting the new regulations, "Amateur stations must use adequately filtered direct current power supply or arrangements that produce equivalent effects to minimize frequency modulation and prevent the emission of broad signals." This article has been written to serve as a guide to those who may not be sufficiently familiar with rectifiers and filters. It is by no means a complete exposition of the subject, however, and the bibliography at the end will be found most useful if more detailed information is desired. — EDITOR.

WITH the advent of revised amateur regulations, it behooves some of us to take stock of our power supply equipment and see how closely we conform to the provision that amateur stations must have "an adequately filtered d.c. plate supply." A generator or transformer-rectifier with a conglomeration of chokes and condensers does not necessarily provide the type of power supply required; on the other hand, the apparatus to produce such an effect is not necessarily highly complicated and expensive, provided it is properly designed.

There are many factors which enter into the production of a steady d.c. signal, not the least of which is the adjustment of the transmitter. No matter how good the rectifier and filter system might be, if given a fair chance a poorly adjusted transmitter can nullify its effects to such an extent that a great deal of the money invested is simply wasted. Paraphrasing an old adage, "All is not d.c. that has a rectifier and filter." This article is, however, primarily concerned only with the power supply system. Adjustment of the transmitter has been so often and so well covered during the past two years that we shall not go into it now. Suffice to say that those *QST* articles covering the results of the Technical Development Program constitute a complete source of information on this subject.

The only source of really continuous current is a battery. Probably next in line is the d.c. generator, although the output of such a machine is not steady and continuous. A generator is simply an alternating-current machine with a mechanical rectifier, and the smoothness of the output depends almost entirely upon the construction of the rectifier, or commutator. The greater the number of segments, the better will be the output, but an infinite number would be required for "pure" d.c., whereas insulation considerations on high voltage machines and the actual space limitations are such that the output usually has a considerable amount of ripple voltage. This means that the output of such a machine cannot be considered suitable unless a filter is provided to diminish the ripple to a negligible amplitude. An unfiltered generator is therefore in almost the same category as an unfiltered transformer-rectifier system, and must be treated with the same care. The redeeming feature is that the ripple voltage is in most cases much higher in frequency and lower in amplitude than with the transformer-rectifier at ordinary supply frequencies, and consequently a small filter is sufficient, provided the commutator is kept clean and the brushes are properly adjusted.

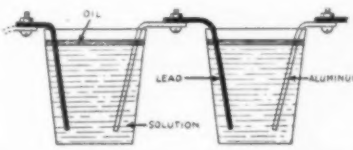


FIG. 1. — TYPICAL CHEMICAL RECTIFIER CONSTRUCTION

The commonest metals used for electrodes are lead and aluminum, although some others may be employed. A wide variety of solutions has been used with success. (See bibliography at end of this article.) The immersed portion of the electrodes is ordinarily made so that there will be about one square inch of surface for every 50 m.a. the rectifier will be required to furnish.

However, the number of amateurs using high voltage d.c. generators is comparatively small; therefore we will for the present confine ourselves to those systems which use a transformer for stepping the voltage up to the required value, following which the output of the transformer is fed into a rectifier and filter.

As we cannot hope to go into a great amount of detail in this story, a bibliography on the subject of rectifiers and filters has been prepared and appears at the end of this article. It is recommended that the reader look over it for references which are of particular interest to him. Our present purpose is simply to point out the various methods and types of apparatus which are in use, the selection being left to the individual preferences of the constructor.

TYPES OF RECTIFIERS

Several types of rectifiers are available, each having its own set of advantages and disadvantages. The most commonly used ones may be divided into five general classifications: electrolytic or chemical, thermionic, hot-cathode mercury-vapor and mercury-arc.

CHEMICAL RECTIFIERS

The chemical rectifier is perhaps the cheapest of all, particularly for low-voltage installations. Its construction is simple, and it will give very satisfactory results if properly handled. The voltage drop and leakage are somewhat higher

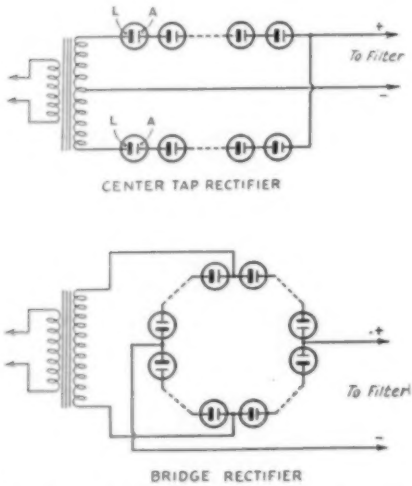


FIG. 2. — CHEMICAL RECTIFIER CIRCUITS

One jar should be used for every 40 or 50 volts furnished by the transformer. A center-tapped transformer whose output voltage is 1100 (total) therefore requires about 24 jars, 12 on each side. With the bridge arrangement, two sets of jars are across the total transformer voltage, and although this voltage is cut in half for the same d.c. output voltage, the number of jars required remains the same, i.e., 24 jars will be necessary for a 550-volt transformer.

than with other types of rectifiers. The output is, however, not hard to filter, and this fact, together with its low cost, should recommend the chemical rectifier to a great number, particularly those using low-power outfits.

Such a rectifier usually takes up quite a bit of room, depending upon the type of cell and solution used. With simple solutions, such as borax or bicarbonate of soda dissolved in water, the maximum voltage per cell should not be much higher than 40 to 50. A typical cell of this kind is shown in Fig. 1. A jelly glass or preserve jar holds the solution, and the electrodes are usually lead and aluminum strips. The size of the electrodes is determined by the current which the rectifier must pass. A current density of about 50 milliamperes per square inch of immersed aluminum surface is quite generally used. With organic electrolytes, however, much higher voltages than 50 can be used, ranging anywhere from 100 to 150 per cell. The construction of a chemical rectifier of the latter type will be described in a coming issue. For best results the elements and the components of the solution should be as nearly chemically pure as possible, and material of this sort is sometimes hard to obtain. Other disadvantages are that the rectifier must be formed initially, and reforming is necessary if it is allowed to remain idle for any length of time; water evaporates from the solution and must be replaced at more or less frequent intervals; and the solution sometimes creeps and makes a messy job. Electrically, however, it is entirely adequate for the purpose when properly built. The connections for both the center-tap and bridge rectifier circuits are given in Fig. 2.

THERMIONIC RECTIFIERS

Thermionic tube rectifiers, such as the Type '80 and '81, are now generally used only for the lower voltages. They have been displaced at higher voltages by the more efficient mercury-vapor rectifier. However, they, like the chemical rectifier, are entirely suitable for low-power work and in many respects constitute the most desirable rectifier for sets employing a Type '10 tube or those of lower voltage rating. A Type '81 will pass 85 milliamperes. With a pair of tubes in a full-wave circuit, the allowable current is 170 m.a.

The connections for a full-wave rectifier using Type '81 tubes are shown in Fig. 3. The half-wave rectifier circuit requires only one tube, and the transformer secondary need not be center-tapped, but since the output has only half as many "humps" per second as with a full-wave

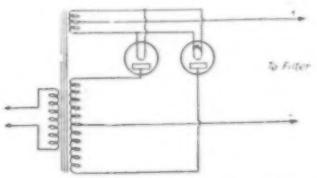


FIG. 3. — FULL-WAVE RECTIFICATION WITH THERMIONIC OR MERCURY-VAPOR TUBES

rectifier, it is more difficult to filter. Thermionic tubes are not recommended for use in a bridge rectifier, because their high resistance and lack of close uniformity prevent the tubes from dividing the load properly.

The Type '80 tube is designed for lower voltages, and in itself is a full-wave rectifier. The applied voltage should be not greater than about 400 per plate, and the tube will pass 125 m.a. It

is thus suitable for sets employing a Type '10 or smaller tube where the voltage required is not over 400. The connections of the Type '80 tube in a full-wave rectifier circuit are shown in Fig. 5. This tube should not be used when the power transformer furnishes more than 400 volts each side of the center-tap.

Thermionic rectifiers are very easily installed, are compact, noiseless in operation, require no particular attention, and will last a long time with reasonable use. Their cost is comparatively small, and they can be obtained at almost any radio store. The voltage drop through them is not so high as to present any particular difficulty with an amateur transmitter, and is of about the same order as the drop in a good chemical rectifier. They are not so good in this respect, however, as the more expensive hot-cathode mercury-vapor rectifiers.

GASEOUS-CONDUCTION RECTIFIERS

Gaseous-conduction rectifiers, such as the Raytheon BH, can be used in transmitters employing a receiving tube as the oscillator, or for the low-power stages of an oscillator-amplifier transmitter where the voltage required is not more than about 300. At the present time these rectifiers are not manufactured for higher voltages. Since the tube has no filament, it is unnecessary to have an extra winding on the power transformer for rectifier tube filaments. The voltage drop in the tube is somewhat less than with a thermionic tube of similar rating. In the field where such a rectifier can be employed, the other advantages are the same as those of thermionic rectifiers.

HOT-CATHODE MERCURY-VAPOR RECTIFIERS

Mercury-vapor rectifier tubes such as the Type '66, '72 and Rectobulbs are intended for all voltages up to about 3500, depending upon the kind of rectifier circuit used. They are, therefore, the tubes to use with sets employing Type '03-A, Type '52 and Type '04-A tubes. The ratings on these rectifiers are somewhat different from those of thermionic rectifiers, as the operation of the tube is different. With a thermionic rectifier, the voltage which the tube will stand is limited only by the insulation in the tube itself, particularly between the wires in the glass stem. This is not the case, however, with mercury-vapor rectifiers, because as the voltage is increased beyond a certain critical value, known as the "arc-back" voltage, a heavy current will flow in the opposite direction and ruin the tube. The maximum current which the tube can safely pass is limited by the filament emission. For these reasons, the tubes are rated at "maximum inverse peak voltage" and "peak current." The inverse peak voltage is the highest voltage which the tube can stand, applied in the opposite direction to normal current flow. The term "peak current" is self-explanatory.

The inverse peak voltage is the peak voltage furnished by the transformer, and in the case of a pure sine wave will be 1.41 times the *total* voltage across the transformer terminals. For instance, with a full-wave rectifier using a center-tapped transformer, if we assume that the transformer gives 1500 volts each side of the center tap, the total secondary voltage will be 3000, and the inverse peak voltage which each rectifier tube will have to stand will be 3000 x 1.41, or 4230 volts. The peak current depends upon the type of filter employed, or more particularly, is determined by the layout of the input side of the filter. If a 2-μfd. or larger condenser is connected directly across the rectifier output, the peak current through each tube is three times the load current (assuming two tubes in the rectifier). In other words, a load of 200 m.a. will mean a peak current of 600 m.a. through each tube which is the maximum safe current for a Type '66. If an inductance of 10 henrys or more is connected between the rectifier and the first filter condenser, the factor drops to 1.5.[1] Under these conditions, however, the voltage is not as high as with a condenser across the rectifier without a choke in series.

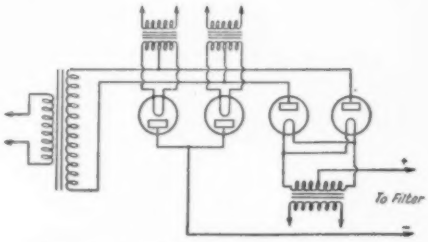


FIG. 4.— A BRIDGE RECTIFIER WITH MERCURY-VAPOR TUBES

This arrangement is used when the power transformer has no center-tap, or when the d.c. voltage required is more than 2000. Four tubes and three filament transformers are necessary.

The connections for these tubes are shown in Figs. 3 and 4. For d.c. voltages of 2000 and over it may be found that it is actually cheaper to use the bridge arrangement with a transformer which has only a single secondary winding, since the cost of center-tapped transformers for higher voltages is a great deal more in proportion to tube cost than is the case at the lower voltages, and the extra filament windings are relatively inexpensive.

The inverse peak voltage with either the center-tap or bridge arrangement is the same (total transformer voltage times 1.41) so that the bridge connection will give approximately twice the d.c. voltage obtainable with center-tap rectification. Hot-cathode mercury-vapor rectifiers lend themselves very well to the bridge arrangement,

[1] "A New Type of Rectifier Tube for Amateur Use," page 20, February '29 *QST*.

because the internal drop is small and the tubes match up well. The drop is only about 15 volts regardless of the current through the tube.

MERCURY-ARC RECTIFIERS

The mercury-arc rectifier is the real brute for high power work. These rectifiers are capable of standing applied a.c. voltages of the order of 5000 or 6000, and will pass a current of several amperes. The voltage drop in the tubes is approximately 15 volts — the same as in mercury vapor tubes. Their cost is comparatively low, the kind used for battery charging being suitable. As a matter of fact, a number of amateurs have successfully used old tubes which they have obtained at very low cost from power companies after the tubes had begun to operate unsteadily in series street lighting systems.

It is necessary to start the arc each time the rectifier is to be used, and as soon as the load is removed the arc goes out; therefore some means must be provided for maintaining the arc during transmission, because the load is being rapidly thrown on and off when keying. In order to start the arc the tube must be tipped mechanically so there will be an instantaneous connection between the mercury pools in the starting electrodes to form an arc, and in order to maintain it some form of "keep-alive" circuit must be employed. A typical mercury-arc rectifier and circuit are shown in Fig. 6.

The keep-alive circuit uses a transformer which gives about 50 volts each side of the center tap, and employs a full-wave rectifier with Tungar or Rectigon bulbs. In order to maintain the arc in stable operation it is necessary to filter the output to some extent, and for this purpose the choke shown in the diagram is used. A small choke which will pass about two amperes without undue heating is usually sufficient. The primary of an old transformer rated at 100 watts or more will work satisfactorily if no choke is available. The current in the circuit will ordinarily be of the order of 2 amperes, because with less current the arc is quite likely to go out. Higher keep-alive current will heat the tube unnecessarily and may shorten its life.

FILTER CHOKES

Filter chokes are in one respect a great deal similar to radio frequency chokes — it is hard to tell whether or not the things are operating as they should. Manufacturers' ratings are often confusing because the inductance of the choke varies widely with the amount of d.c. flowing in the winding, and it has not been the practice to state whether the inductance measurements were made with the rated d.c. flowing, or whether the rated current is simply the maximum which the winding can safely carry, and the inductance is measured with a.c. only. A choke which is rated at 30 henries with no d.c. flowing in the windings can very easily drop to 10 henries or less with a current which does not tax the capacity of the wire.

Good chokes are made with air-gaps at some point in the core. This reduces magnetic saturation of the core, and at the same time reduces the inductance of the choke, but under load conditions it is quite possible that the inductance will be higher with a choke which has an air-gap of proper size than would be the case with a choke of much higher "a.c. inductance" with no air-gap. This point should be kept in mind in selecting a manufactured choke, or in building one at home.

The design of filter chokes of different inductance values for almost any conceivable type of amateur transmitter is well covered in the *Handbook*. Tables are given showing the proper core size, size and number of turns of wire, air gaps, inductance and other factors which enter into the construction of a choke.

FILTER CONDENSERS

Aside from tubes, there is probably no other item in an amateur transmitter which requires more frequent replacement than the filter condenser. This is not usually the fault of the condenser manufacturer, but is more often caused by the failure of the amateur himself to take into account the conditions under which the condenser must work.

After much confusion among manufacturers' condenser ratings, the practice has been generally adopted of rating them at the maximum d.c. working voltage. This, it must be understood, is not the a.c. effective voltage supplied by a transformer. As mentioned above in connection with mercury-vapor rectifying tubes, the peak transformer voltage will be 1.41 times the rated voltage, provided the wave form is of sine shape. It often happens that the wave form is considerably distorted by the time a transformer at the end of a long line is reached, and the peak may very readily be higher than this value. A fairly good working rule to follow is that the filter condensers should be rated to stand at least 50 per cent more voltage than the transformer secondary supplies. In the case of a full-wave rectifier working from a center-tapped transformer winding, only the voltage on each side of the center-tap is considered, because so far as the filter condensers are concerned, the two halves of the transformer are in parallel.

As an example, a filter condenser to work with a transformer giving 500 volts each side of the center-tap should be rated to stand 1.5 times 550, or 825 volts. The standard safe voltage rating nearest to this is 1000, and 1000-volt condensers are therefore the size to use. Similarly a transformer giving 1500 volts each side of the center-tap would require condensers rated at 2250 volts, and a 2000-volt transformer will necessitate the use of 3000-volt condensers.

Failure to observe this rule in buying filter condensers is almost sure to result in very short condenser life. It is therefore well to invest a little more money in adequately-rated condensers in the beginning and obviate the necessity for replacement later on.

There are two types of condensers now generally available, electrolytic (d.c. only) and paper (a.c. or d.c.). For d.c. voltages of 1000 or less, the electrolytic condensers are cheaper per microfarad than the paper type. However, since electrolytic condensers are not made to stand voltages much higher than 500 per unit, it is necessary to use the proper number of them in series for higher voltages, so that the difference in cost for voltages over 1000 is a negligible consideration.

The leakage current with electrolytic condensers is much higher than is the case with good paper condensers; but on the other hand, if the voltage rating is exceeded, the electrolytic condensers will not puncture, but simply allow more leakage current to pass. The usefulness of the condenser is not impaired, although the capacity drops off rapidly as the rated voltage is exceeded. With paper condensers, the punctured section is useless and must be replaced by a new one.

The method of using electrolytic condensers with high voltage rectifiers has been covered in an article in the March 1930 issue of *QST*. It is recommended that those interested in using this type of condenser read it carefully.

DESIGNING THE FILTER

The filter which is theoretically correct for the particular case in mind may not always be the the most desirable from a practical standpoint. This is usually true when a filter for a transmitter is being considered, because the filter has other functions to perform in addition to its primary purpose of smoothing out the ripple — such as maintaining the voltage at a high level, improving regulation, and others; and in addition must be designed so that it will not do certain things, such as introducing chirps or other keying difficulties.

An excellent article on this subject, "The ABC of Filter Design" appeared in the April, 1930, issue of *QST*. Anyone with an elementary knowledge of algebra can read this article intelligently and apply the principles set forth to his own individual case. The equations that appear in it should not "scare off" the ordinary reader without engineering education — the language is as simple and non-technical as it can possibly be made, and the information is very much worth-while. This article furnished the basis for most of the discussion below.

A plate-supply smoothing filter falls in the classification known as "low-pass" filters, in which the object is to attenuate (weaken) all frequencies higher than the highest frequency to be passed, known as the "cut-off" frequency. The cut-off frequency in the case of a smoothing filter is zero, since only direct current is wanted. However, the design of a filter with zero cut-off is impractical and would require an almost unlimited amount of apparatus; and for practical purposes is unnecessary. The most satisfactory way of attacking the problem, as pointed out in the article mentioned above, is to build a filter with as low a cut-off point as economic considerations, consistent with adequate filtering, will allow.

Before going any farther with this discussion, however, it is necessary to set up some sort of definition of the word "adequate" as applied to a filter. We can say without any qualification that

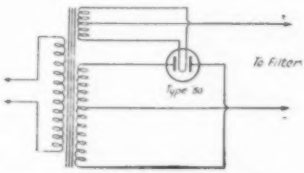


FIG. 5. — CONNECTIONS USED WITH A TYPE '80 TUBE

the adequacy of the filter depends entirely on the transmitter and how it is adjusted. A filter which will be adequate on a crystal-controlled set is far from sufficient on a 1927 transmitter, and even a good outfit can be spoiled by poor adjustment. The answer to this is simply how much the transmitter frequency changes for a given change in plate voltage, because changes in the plate voltage at the supply voltage frequency — in other words, ripple — cause the transmitter frequency to vary at the same rate, giving rise to wobbulation and the well-known mushy and ragged r.a.c. notes so prevalent nowadays. The smaller this change, the smaller will be the filter necessary for a given quality of note, and at the same time there is less difficulty with keying chirps and clicks. A great many of the rough notes we hear on the air could be changed to d.c. or something very close to d.c. by a few simple alterations in the transmitter itself and a little intelligence in adjusting it, without a single change in the rectifier and filter. The antenna current may drop off a little — but actual tests will show a difference in antenna current of as much as 25% or more makes very little difference in signal strength at the receiving end. As a preliminary to building or changing a filter, the article in August, 1928, *QST* on "Overhauling the Transmitter for 1929," and Chapter VI in the *Handbook*, should be carefully read.

The theoretical design of filters is based on the assumption that the characteristic impedance of the filter is equal to the impedance of the output circuit and the impedance of the input circuit. The input and output impedances must therefore

be the same — a condition not often realized in amateur practice. However, this is not as detrimental with a plate-supply filter as it would be with a filter designed for other purposes where the requirements are more exact. The general effect of a lack of matching of impedances is to attenuate all frequencies more than would otherwise be the case — which is exactly what we want to do.

The π-section filter is more suitable for plate supply work than the T-section. This is so because the placing of the condensers is such that voltage regulation is better, and the voltage output is greater than would be the case with a T-section filter. Having decided on this type of section, the question to be settled is how much capacity and how much inductance will be required to give adequate smoothing. About the only exception to the use of π-sections would be in the case of a rectifier using mercury-vapor tubes when it is desired to draw more current than could safely be taken from a system with the condenser next to the rectifier, and when the drop in the voltage caused by placing a choke next to the rectifier can be neglected.

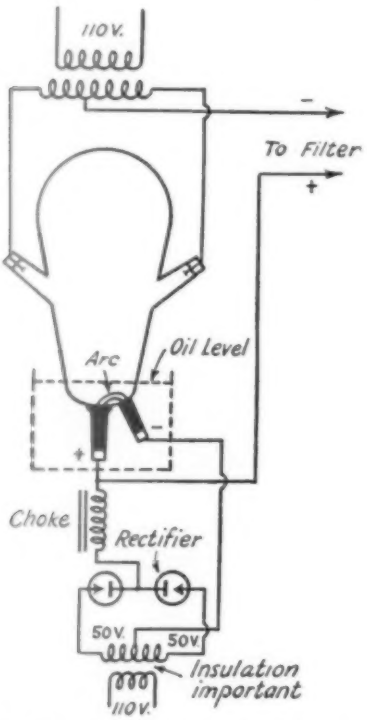


FIG. 6. — CIRCUIT FOR MERCURY-ARC RECTIFIER

Connections for the keep-alive circuit are also shown.

The curves on page 35 of April *QST* give us a clue to the amount of filter necessary. It will be seen by comparing the two drawings that there is no particular advantage in increasing the attenuation constant, α, beyond 5, because at that point the a.c. power passing through the filter is less than 10% of the original amount, and a further increase in α makes very little difference in the result. Experience shows us that, when using a transmitter adjusted so that the frequency changes very little with changes in plate voltage, the note with a filter having such an attenuation constant will be "pure d.c." The problem, therefore, is to build a filter of that type.

The output of a rectifier may be considered as being a steady direct current on which is superimposed an alternating current. The frequency of the superimposed alternating current may be either that of the supply line or twice that figure, depending on whether the rectification is half-wave or full-wave. A cut-off frequency lower than this frequency must be chosen in order that the input frequency and its harmonics will be suppressed. The lower the cut-off frequency chosen, the greater will be the attenuation of the ripple input frequency; also the larger the number of sections in the filter the greater will be the attenuation.

An inspection of the equations on page 35, April *QST*, shows that the higher the allowable cut-off frequency, the less will be the amount of both inductance and capacity required. As an example, if we assume a cut-off of 40 cycles to be sufficient for a half-wave rectifier working from a 60-cycle supply line, an 80-cycle cut-off will result in the same attenuation of a 120-cycle input frequency. The input frequency from a full-wave rectifier on 60-cycle supply is 120 cycles, and the advantage of a full-wave rectifier becomes immediately apparent, because only half as much inductance and capacity will be required to give the same degree of filtering. An even smaller filter will be sufficient with a d.c. generator, because the ripple frequency is usually much higher than 120 cycles. The equation for ripple frequency is

$$f = \frac{\text{R.P.M.} \times \text{No. of segments}}{60}$$

so that a generator with 40 segments running at 3600 r.p.m. will have a ripple frequency of 2400 cycles — and in addition the actual ripple voltage will be only a small fraction of that from a rectifier.

Some different filter combinations and the attentuation constant for each are given in Fig. 7. These are based on full-wave 60-cycle rectification, and the input and output impedances are assumed to be matched to the filter impedance. An impedance of 400 ohms was chosen, as this represents fairly well the plate impedance of most of the transmitting tubes used by amateurs with

the exception of the Type '52. The "brute force" filter shown at (a) is not exactly correct for any tube, as the characteristic impedance is 2800 ohms. The attenuation constant in this case is based on correct matching. It will be noticed from the equations referred to above that, although for a given cut-off frequency the product of inductance and capacity will be the same for any load impedance, the relative amount of each element changes with the load. The higher the load impedance, the greater will be the ratio of inductance to capacity, and vice versa.

The plate impedance of a tube is a variable quantity, and in general is equal to the plate voltage multiplied by the plate current divided by 2. A change in the adjustment of the transmitter which causes the plate current to vary also changes the plate impedance. For this reason the mathematics of filter design cannot be applied too strictly to a plate-supply filter problem — the load impedance is likely to vary within rather wide limits with individual transmitters even though the same kind of tube may be used.

Basing conclusions on the data given in Fig. 7, it might appear that either (c) or (e) would be the best type of filter to use. Theoretically this may be so, but in practical work other considerations are bound to influence the design.

Actual tests on plate supply filters such as are used in B eliminators, which usually consist of two π sections, (such as (c) in Fig. 7, but with different condenser values) indicate that the first condenser — the one next to the rectifier — has the greatest effect on the d.c. voltage output and regulation. In general, the larger this capacity, the higher will be the output voltage and the better will be the regulation, but there seems to be no particular advantage in increasing the capacity beyond 2μfd.[2] The second filter condenser has less effect on the voltage and regulation, but has a very noticeable influence on the ripple, and the larger its capacity the less will be the ripple voltage passed through. Here again, tests indicate that there is no important advantage gained by using a capacity larger than 2 to 4μfd. The chief function of the last condenser seems to be to act as a reservoir to supply momentarily large demands on the plate supply system, and the larger its capacity the better will be the tone quality of a receiver plate supply, or modulation in the case of a 'phone transmitter supply. For c.w. work this is a comparatively minor consideration, and the 8 or more μfd. ordinarily used for audio-frequency work can be reduced to 2 μfd. or less without any deleterious effect. These tests were based on full-wave rectification with 60-cycle supply, and would require some modification for lower frequencies. It should be understood, however, that the various condensers do not have clean-cut distinctions in their functions, but that these functions are more or less intermingled, and a change in any part of the filter will affect all three.

A little consideration of the above facts leads us to believe that the old "brute-force" filter is still a pretty fair arrangement for general amateur work. Actual experience with it shows that it is capable of giving excellent results if the transmitter is adjusted in 1929 fashion. There is no doubt, however, but that it can be improved upon if found necessary. We are almost tempted

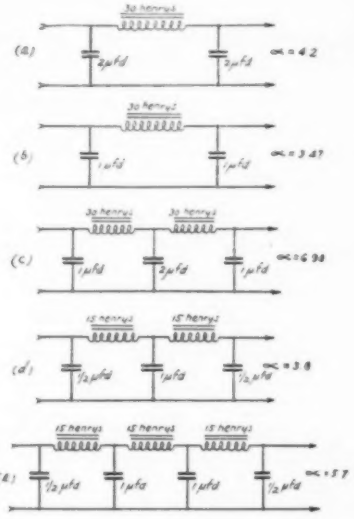


FIG. 7

to say that if the transmitter will not give a d.c. note with a filter of this type and full-wave 60-cycle rectification, there is something wrong with the set itself, although there may be circumstances, particularly on the higher frequency bands, which make a larger filter necessary.

A two-section filter is preferable to a single-section, even though the same total amount of inductance and capacity are used in both cases. The reason for this is that the attenuation constant with two sections is twice that of one, provided both sections are alike, and in addition each added section helps to alleviate the effects of poor matching of impedance. We therefore reach the conclusion that for best filtering it is well to use two chokes and three condensers. On the other hand, the wire used in chokes is not free from resistance, and since quite a lot of wire is required to make a high-inductance coil, it is possible that the voltage will drop appreciably. This results in lower voltage for the tube and is harm-

[2] These tests were described in a series of articles in *QST* during 1927–8. The papers in question are marked with asterisks in the bibliography at the end of the present article.

ful to the regulation, and the latter development may cause a chirpy or "yooping" signal. Again the amount of capacity available may be sufficient for good regulation and voltage in a single section, but when spread over two sections may not be enough from this standpoint, although ample so far as filtering alone is concerned.

Provided there is no limitation on the amount of capacity to be used, however, and assuming that the chokes have fairly low resistance, we would recommend the combinations shown in Fig. 8 in the order given. Any one of the four with a well-adjusted transmitter, not subject to undue variations in frequency with changes in plate voltage, will give a note of excellent character,

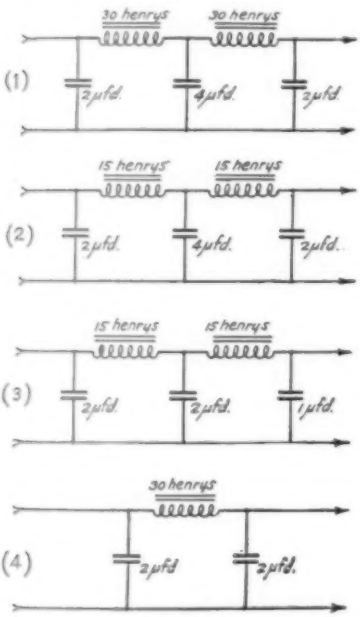


FIG. 8

although the actual filtering decreases with the less elaborate arrangements.

All of the above recommendations are on the basis of full-wave rectification with a supply frequency of 60 cycles. As the frequency is lowered, a correspondingly greater amount of inductance and capacity will be required for the same smoothing. At 50 cycles the difference is small enough to be neglected, or can be made up by the addition of an extra microfarad or so in the second filter condenser. At 25 cycles, however, the picture changes.

The brute-force filter [Fig. 8 (4)] has a natural cut-off frequency of 29 cycles. In other words, a filter of this type will have no effect whatever on the output of a half-wave 25-cycle rectifier so far as the fundamental frequency is concerned, although of course the harmonics will be suppressed. However, in a practical filter there will probably be some attenuation at 25 cycles simply because the input, filter and load impedances are very rarely matched correctly. Even arrangement (1) in Fig. 9 would be of comparatively little value, except for this same effect of poor matching of impedances. In order to get as much filtering as would be accomplished by the brute force filter with a 60-cycle half-wave rectifier, about 10 μfd. of capacity and 75 henrys of inductance would be necessary. A half-wave 25-cycle rectifier would therefore seem to be a rather expensive proposition.

With a full-wave rectifier, however, the brute-force filter will have an attenuation constant of 2.27, as compared with 2.7 with a half-wave 60-cycle rectifier. With two sections — (1) in Fig. 8 — α increases to 4.54, slightly better than a single section with full-wave 60-cycle rectification. As this represents about the least amount of filter which will give a good note with a well-adjusted transmitter, it would seem that our friends who are afflicted with 25-cycle "juice" are in a corner where there is not much to be done except get plenty of filter condensers and chokes. Under certain conditions it may be possible to do very well with less filter than this — these figures are of necessity based largely on theoretical considerations, and the final authority in all cases will have to be the monitor.

And this is equally true regardless of the supply frequency. The basis of comparison is not the number of filter chokes or condensers which may be hooked in the circuit. Final judgment will be rendered on what the thing sounds like. With the aid of the monitor and the *QST*'s which covered 1929 transmitter adjustment it may be possible to do much with little.

BIBLIOGRAPHY OF *QST* ARTICLES

Alternating Current Rectification Applied to Radio, Part 1, page 33, April, '29.
An Unusual Rectifier Cure, page 49, November '28.
Electrolytic Rectifiers, Exp. Section, November '28.
The Duriron-Duralumin Electrolytic Rectifier, page 45, October '28.
Simple Cure for an Old Ailment, page 44, December '27.
Successful Electrolytic Rectifiers, page 33, May '27.
Concerning Electrolytic Rectifiers, page 48, April '26.
Aluminum Rectifiers, page 51, September '25.

Rectifiers, Thermionic

Alternating Current Rectification as Applied to Radio, page 33, April '29.
Power Supply for the Low-Power Transmitter, page 23, February '30.

(Continued on page 78)

The Band-Box Superhet

Converting the Old D.C. Broadcast Receiver to a Modern High-Frequency Superheterodyne

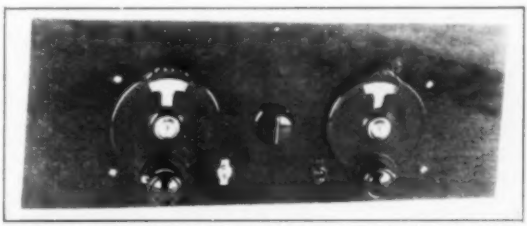
By Howard F. Anderson*

IT is generally conceded that there is no receiver like the superhet for sensitivity and selectivity at amateur frequencies — particularly where high-frequency 'phone reception is concerned. The chief handicaps — also generally conceded — which have retarded the popular adoption of this type of receiver have been high cost and involved construction. In addition to these handicaps, tricky adjustment of oscillator coupling and tedious manipulation of oscillator and first detector tuning circuits have been discouraging features of most high-frequency superhets.

Here is a real high frequency superheterodyne receiver, however, which practically whips all these disadvantages. Low cost and simplified construction are obtained by using an obsolete broadcast receiver as the foundation and a space-charge first detector, with resistance coupling between it and the oscillator, eliminates most of the difficulty in getting these two units working together without mutual detuning effects at even the highest amateur frequencies. Moreover, the 1550 kc. intermediate frequency used precludes all possibilities of "repeat" points. The tuning is truly "single spot" — all the way up to 21,000 kc.

The general design is based on the circuit of L. W. Hatry's HY-7 superhet which also uses a space-charge first detector and 1550-kc. intermediate screen-grid amplifier.

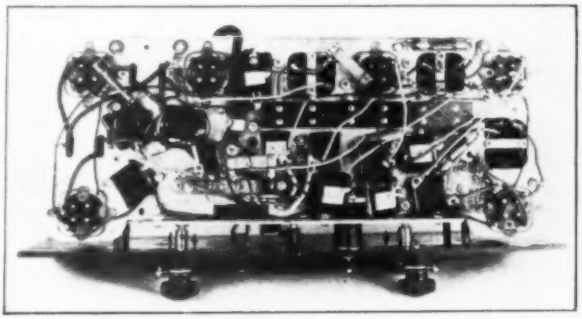
Nowadays most everyone is familiar with the general working of superheterodyne type receivers, particularly the high intermediate frequency variety. Since it is the intention that this article be primarily a how-to-do-it affair rather than a dissertation on the theory of superhets, the how-and-why will be omitted. It might be a good idea, however, for the builder to review the theoretical aspect of this type of receiver before starting actual construction; a wealth of information on the subject will be found in past issues of *QST* — particularly in Ross Hull's article in March, 1929, and L. W. Hatry's "Improving the All-Purpose Superheterodyne" in September, 1929.



THE PANEL ISN'T CLUTTERED UP WITH A LOT OF CONTROLS

The dial at the left is for detector tuning and that at the right is for oscillator tuning. The right-hand switch is in the filament circuit and the one at the left controls oscillation of the second detector. The knob in the center is for volume control.

The general scheme in this particular superhet is to use the old broadcast receiver's r.f. inductances as the intermediate frequency coupling coils with a few turns removed from each coil to raise the upper frequency limit to 1550 kc. They are tuned by the "neutralizing" condensers of the broadcast receiver. A high-frequency oscillator and first detector are added, of course, and the detector of the B.C. set becomes the second detector of the super — the audio amplifier being left "as is." This conversion method can be practiced on almost any tuned r.f. broadcast receiver possessing individually shielded inductances. The dope here will apply specifically to only the old Crosley Bandbox d.c. set, however, and similar treatment for other sets can be



THE UNDERSIDE OF THE SUBPANEL

The by-pass condensers and resistors are mostly held in place by the wiring. The idea is to make the connections as short and direct as possible; the parts are placed wherever convenient.

*W1BVS, 28 Maple, Torrington, Conn.

worked out on the same plan by the individual experimenter.

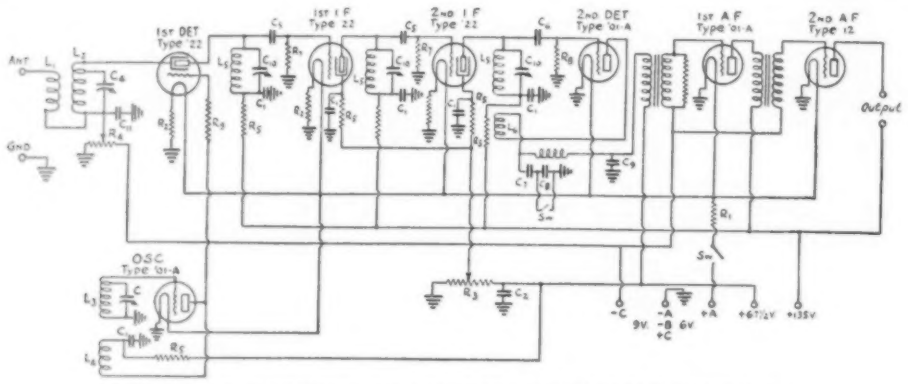


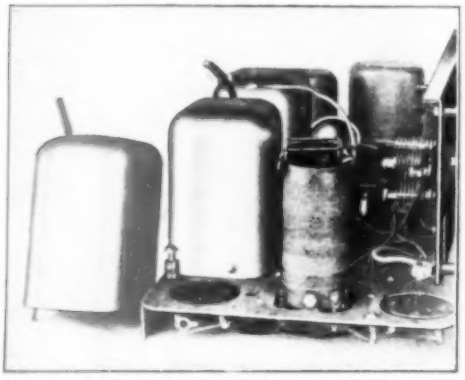
FIG. 1. — THE COMPLETE CIRCUIT OF THE BANDBOX SUPERHET

L_1 and L_2 — First detector inductance. See table and Fig. 2.
L_3 and L_4 — Oscillator inductance. See table and Fig. 2.
L_5 — Intermediate frequency coils. See text.
L_6 — Tickler coil for second detector. See text.
C_1 — 0.25-μfd. Sprague midget fixed condensers.
C_2 — 1.0-μfd. by-pass condenser.
C_3 — 50-μμfd. Pilot midget condenser. Oscillator tuning.
C_4 — 50-μμfd. Pilot midget condenser. First detector tuning.
C_5 — 500-μμfd. fixed grid coupling condensers.
C_6 — 250-μμfd. grid condenser, second detector.
C_7 — 250-μμfd. fixed regeneration condenser.
C_8 — 150-μμfd. fixed regeneration condenser.
C_9 — 100-μμfd. by-pass condenser.
C_{10} — Neutralizing condensers of Bandbox.
C_{11} — 0.01-μfd. by-pass condenser.
R_1 — 1-ohm fixed resistor, tapped near center. See text.
R_2 — 15-ohm filament resistors.
R_3 — 100,000-ohm potentiometer. Volume control.
R_4 — 500,000-ohm potentiometer. First detector bias control.
R_5 — 2000-ohm Electrad flexible resistors.
R_6 — 100,000-ohm fixed grid-leak type resistor.
R_7 — 3-megohm grid leaks.
R_8 — 5-megohm grid leak, second detector.
R_9 — 10,000-ohm grid-leak type resistor. Oscillator coupling.
"Grounds" indicate connections to chassis.

The following additional parts are also required:
1 7" x 18" x 3/16" Bakelite panel.
2 Vernier dials.
2 5-prong sockets for coils.
1 4-prong socket for oscillator tube.
1 Broadcast-band radio frequency choke.
3 Gridleak mountings.
2 Toggle switches.
15 Silver-Marshall 130-P or similar coil forms for oscillator and first detector inductances.
2 feet of shielded wire.

DESTRUCTION — AND RECONSTRUCTION

Procure from a local dealer a Crosley *Bandbox* battery set. This will cost from $5.00 to $10.00, although some dealers might give them away since the receiver is obsolete. Take off the dials, escutcheon plate and the four screws on the bottom that hold the box on. Now remove the bottom plate. With this done, disassemble the three tuning condensers and the dial arrangement and take off the switch and rheostat. These parts will be of no more use.



ONE OF THE INTERMEDIATE FREQUENCY COILS

The grid coupling condenser is mounted on the top of the coil form. The lead connected to one terminal of this condenser is pulled through the top of the can when the latter is put in place. The other terminal of this condenser is connected to the top end of the inductance.

Turn the set over and take off all leads going to the r.f. coils as well as the plate and grid leads to the r.f. tubes. Leave the audio end alone and leave the grid condenser and leak in place. Be sure to save all screws and nuts because they will be needed.

The foundation kit for the superhet is the result of this process and with the disassembling done, assembly of the new receiver can be started.

There are four neutralizing condensers in this set. Take out the one next to the detector since it will not be used. Unfasten the next two and turn them around so that the lugs face toward the rear of the set but leave the fourth one in position. These condensers are to be the tuning condensers for the i.f. transformers.

Remove the cans from the r.f. coils and then remove the coils by loosening the nuts beneath the sub-panel which hold them in place. Take the plate coils out of them all and rewind one of

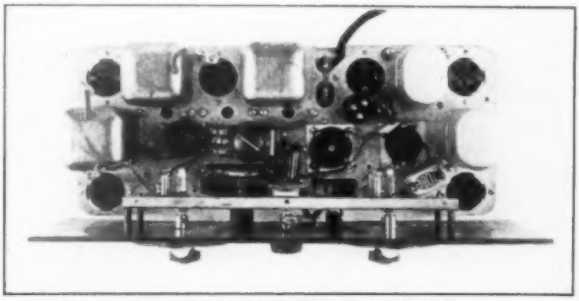
these plate coils with ten turns of No. 30 d.s.c. wire, being sure to wind in the same direction as the winding on the r.f. coil. This rewound coil is the tickler for the second detector. The other two plate coils will not be used.

It will be found that the r.f. coils each have 106 turns of wire and 20 turns should be removed from the bottom end of each one. The tickler should be put in the detector coil before it is replaced in the set.

The two grid coupling condensers for the i.f. tubes are mounted on top of the coils with the lugs bent over the coil form and a drop of Duco cement put on each to hold them in place as shown in the illustration. Leave the cans off until the wiring is finished; it will be a lot more convenient.

Now the two 50$\mu\mu$fd. Pilot tuning condensers for detector and oscillator can be mounted. They go in the outside holes where the old tuning condensers were, with some $\frac{3}{8}$" washers to take up the extra space. Be sure the first detector tuning condenser is insulated from the chassis as this has the bias voltage for the first detector on it. A paper washer on each side will fix this.

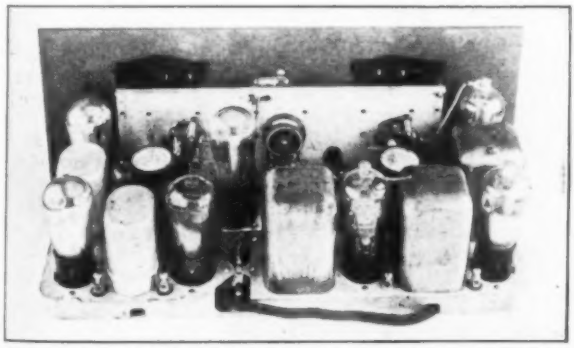
Mount the 100,000-ohm potentiometer in the center hole and use washers to insulate this too. Mount the detector coil socket, the oscillator tub socket and coil socket according to the diagram. The 500,000-ohm potentiometer is mounted on its bracket with proper insulation and fixed to the sub-panel.



THE LAYOUT OF THE BASEBOARD

The knob just to the left of the center is the bias control for the first detector. The socket immediately to its left is that of the first detector and the two to its right are for the oscillator tube and oscillator inductance, respectively. Starting at the lower left, the other tube sockets are: First detector, first i.f., second i.f., second detector, first audio and second audio. The i.f. coils are inside the three large cans and the audio transformers in the two smaller cans.

Short extension shafts connect the tuning condensers and the volume-control potentiometer to the panel controls.



MOST ALL THE APPARATUS IS LEFT IN ITS ORIGINAL ARRANGEMENT

The first detector and intermediate amplifier at the right side and the second detector and audio amplifier at the left.

NOW FOR THE WIRING

The filament circuit is wired first. Remove the resistance wound on the terminal block from which there is a wire going around to all sockets; disconnect the wire from the terminal block and connect a lead from it to one oscillator filament terminal. Now take the 1-ohm fixed resistance, R_1, and solder it in place of the old resistance. Take a tap off R_1 near its center and connect to one end of the common filament lead. This will give between .6 and .7 ohms. Mount the three 15-ohm resistors between the negative filament of the three screen grid tube sockets and the chassis.

Connect the other filament terminals on all the other tube sockets, including the oscillator tube, to the chassis. Connect the black wire in the cable to the chassis. This is "−A," "−B" and "−C."

The wire, which goes to all sockets, is connected to one end of R_1 and is the positive lead. The other lead from the resistance and the yellow lead in the cable go to the filament switch on the panel.

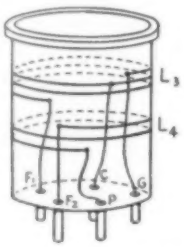
Now proceed to the grid and plate leads on the first detector and i.f. amplifier. First of all, connect the neutralizing condensers to the r.f. coils. Of the four 2000-ohm flexible resistors, two should be connected in the screen grid supply circuits and two in the plate supply circuits of the i.f. tubes. These act as r.f. chokes.

The grid leaks come out on top of the cans and grid-leak leads go down through the center of r.f. coils.

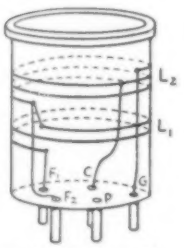
The photos illustrate how the by-pass condensers are mounted and every ham will have his own idea about laying out the apparatus below the base. It should be remembered, however, that the plate leads on the first and second i.f. and first detector tubes are shielded.

The second switch on the panel is the regeneration and oscillator control for the second de-

tector. There is one 150- and one 250-$\mu\mu$fd. fixed condenser in series in the plate lead of the second detector. For regeneration the switch is open leaving the two condensers in series and for c.w. the switch is closed, which shorts the .00015-μfd. condenser and allows the second detector to oscillate. It is also possible to get regeneration



TAPPED OSCILLATOR COIL



TAPPED DETECTOR COIL

FIG. 2. — THE ARRANGEMENT OF THE WINDINGS ON THE COIL FORMS

Connections are shown for tapped grid coils. For the untapped coils, a jumper is connected between "C" and "G" inside the coil form. This connects the tuning condenser across the whole winding. Connections to the coil sockets are shown in Fig. 3.

without oscillation by changing the "67 volt plus" to "90" or "110 volt plus" and turning down the volume control so that the screen grid voltage is low enough to stop oscillation. This certainly boosts up the signals.

There is not much to say about the panel. There are two tuning controls, the oscillator and first detector. The oscillator really needs a vernier dial but the detector does not necessarily need one as it is not critical at all. The center knob is the 100,000-ohm potentiometer which is the volume control. The two toggle switches are for the filament and for the 'phone-c.w. control.

The circuit uses the "Ultradyne Modulator" system on the oscillator and first detector. This seems to work the best of all and does not need any pick-up coils which cause lots of trouble by interlocking in tuning, especially on the higher frequencies.

Now for the oscillator and first detector coils. The secret of the operation of the super is to have these coils proportioned correctly.

An effort has been made to limit the tuning

TABLE OF COIL DATA

FIRST DETECTOR COILS

Coil No.	No. Turns L_1	No. Turns L_2	Approx. Freq. Range, Kc.	Remarks Tap on L_2
1	5	50	1840–2740	Not tapped.
2	3	33	2875–4450	Not tapped.
3	2	19	4425–6750	Not tapped.
4	2	13	5700–8950	Not tapped.
5	2	11	9300–11,100	Tapped 5 turns from filament end.
6	2	8	10,250–13,600	Tapped 5 turns from filament end.
7	2	8	12,450–14,225	Tapped 3 turns from filament end.
8	2	6	13,500–17,100	Tapped 2½ turns from filament end.
9	2	3	17,400–21,000	Not tapped.

OSCILLATOR COILS

Coil No.	No. Turns L_3	No. Turns L_4	Approx. Freq. Range, Kc.	Turns Tapped on L_3	Det. Coils with which Used.
1	31	13	3000–4400	None	1 and 3
2	18	9	4375–6250	None	2 and 4
3	8	7	10,590–11,700	4	3 and 7
4	8	6	8700–11,200	7	6
5	4½	4	14,900–16,000	2¾	8
6	2½	2¾	19,400–21,000	None	9

No. 30 d.s.c. wire is used for L_1 and L_4 on all coils and for L_2 and L_3 on No. 1 detector and oscillator coils. L_2 and L_3 on all other coils are wound with No. 22 d.s.c. wire.

ranges of these coils to 1500-kc. each so as not to have any repeats on the oscillator. A few of them do run over but not badly enough to jumble up everything.

A station heard around 0 to 5 may come in again around 95 to 100 on the oscillator dial, but is very difficult to hold fast to a 1500-kc. range in the high frequency and since to do so would require too many coils to cover the necessary bands.

The detector and oscillator coils have only two windings each but are wound on S-M 130-P coil forms so that a tap could be taken off from the grid coils to give band spreading in the amateur bands. The table gives the number of turns and approximate range of each coil. Of course others can make coils to suit themselves always remembering to figure on a 1550-kc. difference in tuning range between detector and oscillator coils.

THE FINAL ADJUSTMENT

After you have the set finished and wired, connect a pair of 'phones to the speaker terminals to check up the set. Be careful and don't clamp them on your ears tightly because this set has some kick. Then turn on a vacuum cleaner, hair dryer or some other local QRM maker to furnish a signal for balancing up the i.f. circuits. Make a

(*Continued on page 82*)

Advanced Transmitter Design

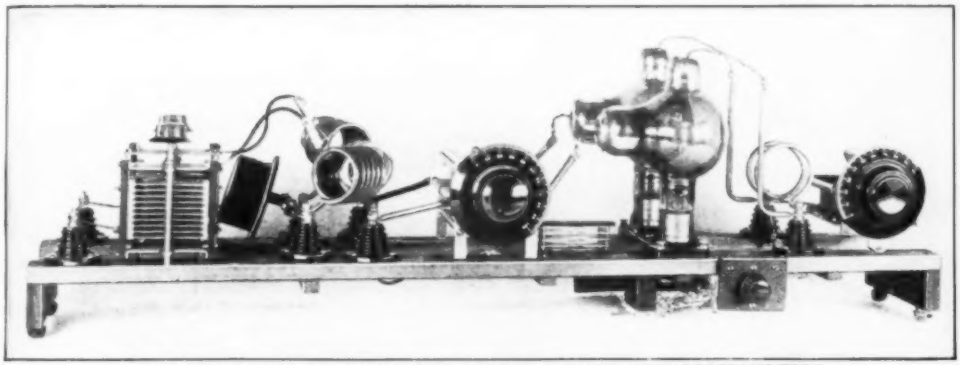
Getting 3500-kc. Performance from the 28-mc. Transmitter

By James J. Lamb, *Technical Editor*

IT is often puzzling to find that the perfectly reliable old 3500-kc. transmitter becomes not so reliable at 7 mc. or that it sometimes becomes wildly erratic at 14 mc. and altogether refuses to work at 28 mc., even though the orthodox changes have been made in the tank circuits and radio-frequency chokes to transmitter which was born of our trials and tribulations.

SOME TRANSMITTER TROUBLES — AND THEIR SOURCES

It is rather difficult to determine just where to dive into a discussion of the sources of 28-mc.



THE PUSH-PULL TRANSMITTER WHICH SOLVED THE DIFFICULTIES

It uses two Type '52 tubes and delivers d.c. signals at 28 mc.

The tuned-grid circuit is to the right of the tubes and the tuned plate circuit is to their left. The antenna ammeter is supported by brass strips bolted to the wall insulators on which the two sections of the antenna coupling inductance are mounted. Filament- and plate-supply connections as well as the key-jack are on a terminal strip at the back. The antenna system connects to the two wall insulators at the extreme left of the assembly.

adapt it to these higher frequencies. Almost invariably the note gets rougher as the frequency goes up, creeping becomes a major problem and efficiency goes all to pot. Condensers break down, r.f. chokes burn up, the key sparks violently — and the perspiring ham is likely to come to the conclusion that this 28-mc. business isn't all that it has been cracked up.

Now the fault isn't that of the 28-mc. band as such nor does it lie in the transmitter which was well designed for 3500 or 7000 kc. but never intended for higher frequencies. The circuit diagram for a 28-mc. transmitter may look exactly like the circuit diagram for a 3500-kc. rig, but the assembly of the 28-mc. set involves considerations which do not enter into the make-up of transmitters for the lower frequencies at all. It is these considerations which are responsible for the evolution of this particular article as well as for a lot of preliminary circuit-sleuthing and experimenting on the part of *QST*'s technical gang. We shall start off with a short recital of what we found ourselves up against and then describe the transmitter troubles, since they are of so many different species and a lot of them are hard to isolate. All the usual "bugs" can be grouped into a few classes, however, with the symptoms of the difficulties as a basis for classification.

That the discussion may be intelligible in a practical way, we shall take a specific circuit and tear it to pieces. The selection of the circuit is not so important but let it be one that is of a popular breed. Also, it had best be one most aptly subject to every conceivable variety of "bug" a high-frequency transmitter can have. Personal experience points to the old reliable tuned-grid tuned-plate of Fig. 1. Wait a minute, you t.g.t.p. enthusiasts — no intended reflection on the circuit. It's one of the best, and before we get through it's going to be better yet!

The word-description of the rig is "two tubes in parallel in a high-C t.g.t.p. circuit with shunt d.c. feed to the grids and plates." It has everything in it but the kitchen stove and almost every part has trouble-making potentialities, not only at 28 mc. but at any ham frequency. Recol-

lection of past headaches with just this sort of circuit brings it all back like a bad dream.

The worst thing that can happen to any transmitter is, of course, complete refusal to oscillate, even though it be taking enough plate power to burn out the bearings in the light company's meter. The immediate conclusion is, naturally, that the grid and plate circuits are out of tune. Very well, tune them around a bit. Still no detectable oscillation, and the plates getting whiter and whiter. The grid leak must be open — no, that's not it. It was just tested and is still OK. Moreover, a d.c. milliammeter cut in series with the grid return shows some grid current flowing. The leaks are even getting warm! The tubes must be oscillating or there couldn't be any grid current. And oscillating they are, but not at any frequency to which the tank circuits may be tuned. It's a parasitic oscillation and its frequency is determined by one or both of the sections of the circuit shown in Fig. 2.

PARASITIC OSCILLATIONS

Here we have two perfectly legitimate tuned-grid tuned-plate circuits, one with just the grid- and plate-blocking condensers in series with loops

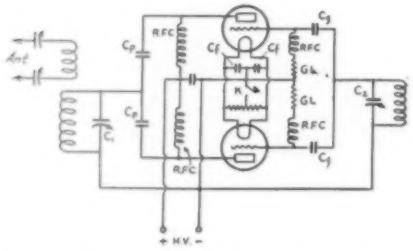


FIG. 1. — A TRANSMITTER OF THIS TYPE CAN BE FULL OF "BUGS" AT HIGH FREQUENCIES

It offers a number of opportunities for parasitic and spurious oscillation.

in the circuit wiring forming a series push-pull hook-up, and the other with the tuning condensers in a series loop and the tubes in parallel. If either (or both) of these series-tuned circuits should happen to hit a resonance condition, requirements for successful oscillation are satisfied (as far as the respective circuits are concerned) and how they do oscillate, usually at some frequency of the order of 60 m.c. or so. Of course the chokes are all off at such frequencies, and the efficiency is terrible. The note, as heard on a monitor, sounds like a power leak.

As further evidence that conditions are not so good, it sometimes happens that the filaments get brighter when the key is closed. This is a pretty certain indication that there is a lot of r.f. flowing through the filaments and an early end to their lives may be expected if the punishment continues. The explanation for this apparent increase in filament current may be traced to several possible causes but the most likely is that the filaments are acting as closed absorption loops approximately resonant to the frequency of oscillation. We shall have more to say about that particular trouble later.

The most obvious method of curing the parasitic oscillation resulting from the series-tuned push-pull grid and plate circuits is to detune one of the circuits. This can be accomplished by increasing the series inductance on either the grid or plate end and a few turns connected at the points marked "X" in the diagram of Fig. 2 may serve the purpose. That doesn't help any in curing the parasitic oscillation of the circuit elements in series with the tuning condensers, however, although a little series inductance might help if connected in the grid portion at "Y." This is only temporizing to make the best of a bad situation, however, and the final recommendations are to be more sound in nature than such resorts to expediency.

A few other possibilities for parasitic oscillatory circuits are shown in Fig. 3. These are more or less remotely dangerous, but their liability is nevertheless worthy of consideration. Analysis of their potentialities for causing trouble is considerably involved because the networks are so mazily inter-dependent, but a few of the more simple combinations should be mentioned.

The circuit elements of Fig. 1 have been rearranged a little in Fig. 3 in order that their trouble-making functions may be easier to point out.

Since the tuning condensers are effectively in series with the blocking condensers across the chokes in the plate circuit and across the chokes and leaks in series in the grid circuit, they are shown thus in Fig. 2. This is obviously bad business, because the tuning condensers are intended to tune the plate and grid inductances and not the chokes. The grid chokes have the leaks in series with them, of course, but leaks are not pure resistances and usually have some distributed capacitance and inductance in addition to the resistance specified on their labels. This distributed capacitance and inductance is negligible at lower frequencies but may become considerable at 28 mc., at least sufficiently considerable to warrant a little suspicion as to the effects on transmitter performance.

Like the resistors, the chokes also have some distributed capacitance (in addition to their intended inductance) although this distributed capacitance is small compared to the circuit capacitance in shunt. As a further complication, the fixed blocking condensers possess inductance as well as capacitance — particularly if the condensers happen to be of the wound type. We know of one classic case in which a moulded fixed condenser had sufficient inductance to make it a resonant circuit at approximately 10 mc., with the consequence that it burned itself up while

being used as a by-pass condenser across a meter in a tuned r.f. circuit. Perhaps the explanation for the mysterious blowing of many filament by-pass condensers — as well as grid- and plate-blocking condensers — can be attributed to "inductive" fixed condensers.

It would seem that enough evidence already had been collected against our old reliable circuit to condemn it entirely, but we aren't through yet. We haven't considered the tube characteristics and capacitances yet; we can't start redesigning the set until a decision has been made on the tubes to be used and the method of connecting them.

With the tubes connected in parallel, the respective grid-filament capacities are in parallel and so are the plate-filament capacities, as well as the grid-plate capacities. Since the evils of such combinations have been explained quite completely in the article, "Push-Pull Transmitters," in *QST* for December, 1928, the whole story need not be repeated here. The conclusion is sufficient: Tubes should never be operated in parallel at high frequencies, particularly in self-excited transmitters.

The choice of tubes is comparatively easy, because it can be based on the specifications of the manufacturers which, in turn, are determined largely by the inter-element insulation and inter-electrode capacities of the tubes themselves. The best bets are the Type '10 for low power rigs and the Type '52 for higher power sets. The others, such as Type '03-A, '11, and '04-A, have comparatively high inter-electrode capacities, as well as other features making them unsuited to ultra high-frequency service. The importance of inter-electrode capacitance and inter-element insulation in tubes used at ultra-high frequencies has been aptly pointed out by H. E. Mendenhall of the Vacuum Tube Research Department, Bell Telephone Laboratories.[1] The information is so pertinent to our problem that Mr. Mendenhall's statement will be quoted verbatim.

"There are several reasons why tubes that are structurally satisfactory for the low-frequency range were inadequate for the high-frequency range.

"In the first place, at the high frequencies the inter-electrode capacity of the elements of the tube becomes very important from the circuital standpoint. The 'charging' or displacement currents which flow through every dielectric in an alternating electric field increase with the frequency of the alternations. These displacement currents heat the various dielectrics whose power factors are not zero, used in and around the tube, thereby causing the ultimate failure of the tube. A 'high' vacuum is the only perfect dielectric, for heat is not developed in it through dielectric losses. It can fail only when leaks or a slow evolution of gas from the parts of the tube change both its status as a vacuum and its insulating properties. The air separating the elements on the outside of the tube will be only about one-tenth as effective an insulator when the tube is oscillating at thirty-thousand kilocycles as compared with the non-oscillating condition, when the same plate potential is applied to the terminals. *The same air gap will be disrupted, moreover, by one-twelfth of the applied voltage if it is alternating at thirty-thousand kilocycles instead of at sixty cycles.* (Italics ours.)

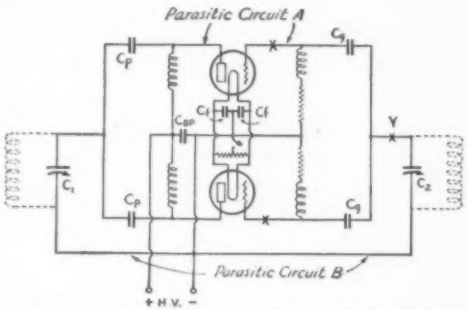


FIG. 2. — CIRCUIT ELEMENTS IN WHICH PARASITIC OSCILLATIONS FIND SATISFACTION

One is push-pull series-tuned and the other is tubes-in-parallel series-tuned. Either is open to suspicion.

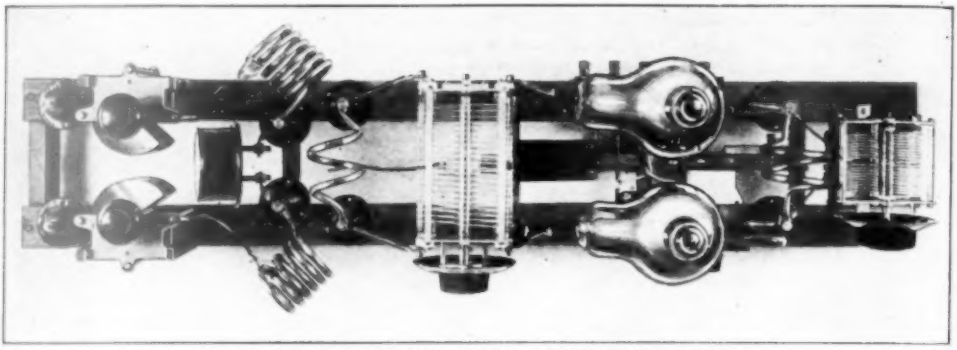
"Another reason for the failure of earlier types of vacuum tubes when used in short-wave circuits is to be found in the 'skin-effect.' A high-frequency current passing through a conductor is forced to travel through a very thin layer at the outside of the conductor. The effective size of the conductor is thus reduced, its resistance correspondingly increased, and overheating engendered."

That's the whole tube story in a nutshell. Summarized in terms directly applicable to our present problem, it means that the tubes used for 28 mc. must have the lowest possible inter-electrode capacity, the greatest possible inter-element insulation both inside the envelope and out, the highest vacuum, the least occluded gas in the elements, and grid and plate leads of adequate effective conductivity at the operating frequency. Even with tubes designed to satisfy these requirements it is advisable to operate with less than maximum rated plate voltage if normal tube life is to be obtained. Leaving out those tubes not intended for operation at ultra-high frequencies, our recommendation is that the d.c. plate voltage be limited to 350 volts for the Type '10 tubes and to 1500 volts for Type '52 75-watt tubes at frequencies above 28 mc.

In order that the effect of inter-electrode capacities on the external circuits may be reduced to the very minimum, the most practical arrangement is, obviously, two tubes in a push-

[1] Bell Laboratories Record, October, 1929.

pull circuit. Moreover, it happens that this type of circuit is adaptable to modifications which eliminate practically all the other weaknesses of our old reliable circuit of Fig. 1. Since the individual steps taken in progressing from the parallel arrangement to the final push-pull circuit of Fig. 4 would make this story unnecessarily tedious, the reasons for the various modifications will be incorporated in the description of the final circuit.



THE LAYOUT OF EQUIPMENT AS SEEN FROM ABOVE

A TRANSMITTER THAT DELIVERS D.C. SIGNALS AT 28 MC.

Before going into the details of the construction of the final transmitter, a summary of its features and operating characteristics will be sketched, particularly for the benefit of those who make a practice of skimming through technical articles and who write the Technical Information Service asking for details which were given in the story but which they apparently didn't bother to read.

It is a completely balanced high-C push-pull transmitter with series d.c. feed to grids and plates. It uses two Type '52 75-watt tubes and is intended primarily for operation on the 28- and 14-mc. bands. There are none of the usual blocking condensers, although there is one home-made insulating condenser which could be omitted, as explained later on. There are no filament by-pass condensers and the r.f. chokes shown in the diagram might be dispensed with, since they are in the circuit for the sake of precaution rather than because they are functionally necessary.

The grid- and plate-tuning condenser rotors are at zero r.f. and d.c. potential to ground. They can be touched while the transmitter is in operation without shock or disturbance of the set's functioning. All tendency to parasitic oscillation has been eliminated by proper proportioning and placemenf of the grid and plate circuit elements, without resort to choking and other afterthoughts. There are no tricky or freak features about the thing; it is based on common, ordinary, "horse-sense" ideas.

ELIMINATING THE BUG OF PARASITICS

As pointed out in the analysis of the circuit of Fig. 1, the principle sources of parasitic oscillations are the series elements in the grid and plate circuits. Since the possibility of parasitics is greatest when the series elements in the grid and plate circuits are in approximate resonance, the best insurance against their occurrence is to make the series elements of non-resonant proportions right at the start. Here is a case where short leads are important on one side and long leads are important on the other. This is one instance in which the time-worn recommendation, "all leads should be as short and direct as possible," must be modified. The plate leads should be short (as short as possible) but the grid leads must be long.

This ratio of grid-lead length to plate-lead length is an important consideration in the design of any piece of high-frequency apparatus containing one or more vacuum tubes. It isn't necessary to have more than one tube to have parasitic oscillations, either. Many a single-tube oscillator or amplifier is "lousy" with them, although they are not often of sufficient amplitude to make the set entirely inoperative. Single-tube tuned-grid tuned-plate rigs are particularly addicted to them, especially those using a Type '04-A 250-watt tube. The usual indication of parasitics in a minor degree is abnormal heating of the tube, poor efficiency, a bum note and erratic oscillation; missing dots, jumping frequency and the like. (If your set shows these symptoms, go on a parasitic hunt.)

In this particular transmitter, the plate leads go directly to the plate tank-circuit tuning condenser and each lead is 3.5 inches long. The grid tank circuit arrangement is a bit different from the usual in that the inductance is mounted between the tubes and the tuning condenser. This allows sufficient length in the leads from the grids to the tuning condenser terminals without overly stringing out the assembly. The total length of each grid lead — measured from the tube en-

velope to the condenser terminal — is 13.5 inches. The connections within each tank circuit (between condenser and coil terminals) are necessarily short, direct, and heavy. The connections within any tank circuit should always be short, of course, because it is in these circuits that large r.f. currents flow and losses must be kept down to the very minimum.

A little study of the various "favorite" circuits immediately reveals that the push-pull t.g.t.p. is the only one which allows a high ratio of grid-lead length to plate-lead length, since all the others require the connection of the grid and plate leads to terminals on a single tank circuit and automatically restrict these leads to approximately one length — unless some of them are run around the block just to make them a little longer. All the other circuits have an additional condemning handicap which would eliminate them from consideration if lead-length ratio didn't put them out. This handicap is their requirement for shunt d.c. feed to either grids or plates. If series plate feed is used, a shunt d.c. grid return must be provided; if series grid feed is attempted, shunt plate-supply feed becomes automatically necessary. This applies to all the Hartley, Ultra-audion, and Colpitts circuits except

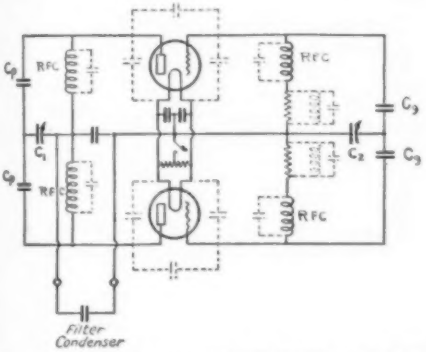


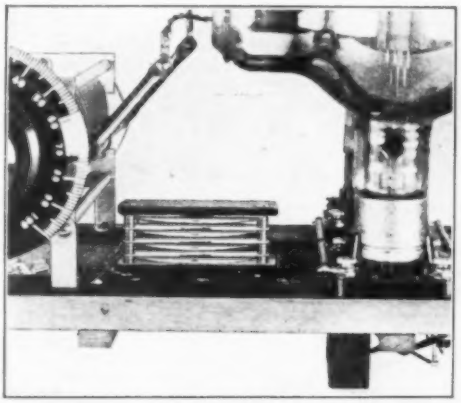
FIG. 3. — GRID- AND PLATE-CIRCUIT CHOKES CAN ALSO CAUSE TROUBLE

The tuning condensers are effectively in parallel with the chokes. Vicious resonance is a possibility.

those which have a blocking condenser in the center of the tank inductance — and the latter arrangement is impractical because a blocking condenser so placed in a high-C tank circuit must carry more r.f. current than any but the most expensive condensers can handle. Moreover, we are skeptical of ordinary fixed condensers in high-frequency r.f. circuits anyway, and one of our aims is to eliminate them as much as possible. It is impractical to build up a compact fixed condenser without considerable dielectric other than air in the electric field; losses in dielectrics other than air can be quite vicious at frequencies above 28 mc., and the more common insulating materials are liable to break-down in even moderate power transmitters. This brings up the matter of blocking and by-pass condensers in general.

ELIMINATING DEPENDENCE ON FIXED CONDENSERS

A study of the circuit of Fig. 4 reveals that there is no fixed condenser in any r.f. portion of



THE PLATE INSULATING CONDENSER IS MADE UP FROM STATOR PLATES OF A WRECKED VARIABLE

It is not in a radio-frequency circuit and may be omitted if the variable condenser has sufficient spacing to withstand the d.c. plate voltage.

the circuit. Moreover, fixed condensers have been omitted where precedent would lead us to believe they ought to be. This has not been done without justification. Their omission not only is possible but is advantageous also. This applies especially to the grid-blocking condenser and filament by-pass condensers.

The fixed condenser between the rotor of the plate tuning condenser and the negative high voltage is simply an insulating condenser, made necessary because the plate tuning condenser sparked over with keying surges. It has no radio-frequency potential across it and can be shorted out at reduced plate voltage.

The omission of the orthodox filament by-pass condenser was decided upon after a number of tests and trials which brought out some interesting though puzzling results. By-pass condensers of several different sizes and types all gave poorer results than none at all. One of the original pair shorted across (apparently from a keying surge) and removal of both of them immediately resulted in an improved note. The substitution of others made no improvement over the first pair and caused a reduction in the quality of the signal. A pair of lamps connected as a center-tapped resistor had the same effect as the various fixed condensers. Using the filament center-tap of the transformer only, however, the note is invariably "near d.c." — the plate rectifier being two Type '66 tubes in a full-wave hook-up and the filter consisting of 1 μfd., 30 henries and 2 μfd. in

the regular brute-force combination. Moreover, there is no sign on r.f. at the filament terminals or in any part of the filament-supply circuit. In fact, this is the first 28- or 14-mc. transmitter with which it has been impossible to find r.f. wandering back into the filament- and plate-supply equipment as well as into the 110-volt lines. The filament- and plate-supply leads are actually at zero r.f. voltage to ground.

An explanation for the inferior performance of the transmitter when filament by-pass condensers were used has not been definitely decided upon, and the most logical conclusion so far reached is that the inductance of the filaments in shunt with the condensers resulted in a pair of absorption circuits, since the filaments are in the intense electric fields inside the tubes and could pick up considerable r.f. The electric fields of the respective tubes are 180 degrees out of phase, of course, and with the filaments properly connected together, without by-pass condensers, the resultant r.f. current through one should be in opposition to that through the other. If the introduction of by-pass condensers should upset this balance, there might be a net flow of r.f. current which, "modulated" by the low-frequency a.c. through the filaments, might in turn modulate the r.f. output of the transmitter. This is largely speculation, however, and is offered for what it may be worth. It remains that with this particular rig the signal and operating stability are better without filament by-pass condensers than with them.

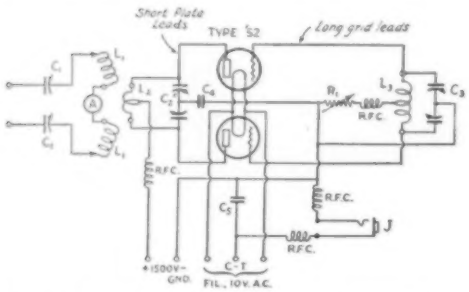


FIG. 4. — THERE ARE NO FIXED CONDENSERS OR RADIO FREQUENCY CHOKES CONNECTED TO POINTS OF HIGH R.F. POTENTIAL IN THIS CIRCUIT

L_1 — Split antenna inductance. Each section has 5 turns of ¼-inch copper tubing and is 2 inches in diameter. Both sections are wound in the same direction.

L_2 — ¼-inch copper tubing plate inductance. 2 turns 2 inches in diameter, spaced 1½ inches between turns, for 28 mc. 4 turns 3 inches in diameter, spaced ½ inch between turns, for 14 mc. Inductances tapped at centers.

L_3 — ¼-inch copper tubing grid inductance. 2 turns, 2 inches in diameter, spaced 1 inch between turns, for 28 mc. 6 turns spaced ½ inch for 14 mc. Tapped at center.

C_1 — Cardwell 43-plate receiving condensers double-spaced. Capacity, maximum 200 μμfd., minimum 50 μμfd.

C_2 — Rebuilt TM-450 National transmitting condenser. See text. Cardwell Type 157-B or General Radio Type 334-Z may be used instead.

C_3 — Cardwell Multiple Type 156-B receiving condenser. Each section has a capacity of 500 μμfd.

C_4 — Fixed air-dielectric insulating condenser, 75 μμfd. See text for details. May be omitted at reduced plate voltage. (1500 or less).

C_5 — Spark-absorption condenser for key, .0012 μfd. May be omitted if key-thump filter is used.

R_1 — Allen-Bradley Type E-210 Bradleyleak. Fixed resistor of 20,000 ohms might be substituted.

R.F.C. — 28-mc. radio-frequency chokes. May be omitted but are recommended. See text for details.

J — Single-circuit telephone jack for key connection.

Tubes are Type '52 75-watters.

SYMMETRICAL TANK AND ANTENNA-COUPLING CIRCUITS

Although the transmitter's plate circuit is not symmetrical with respect to the grid circuit, the plate circuit of one tube must be symmetrical with respect to the plate circuit of the other as must also be the grid circuit of one tube with respect to the grid circuit of the other. The two grid connections to the grid tank must be of the same length and so must be the two plate connections to the plate tank.

In addition to symmetrical connections between the tubes and the respective tank circuits, the tank circuits themselves must be symmetrical about their respective electrical "centers." This requirement calls for not only an exact center tap on the tank inductance but also for tuning condensers which have symmetrical electrical properties. Tuning condensers of the double stator and single rotor type have this feature and such condensers are used for tuning the tank circuits in the transmitter.

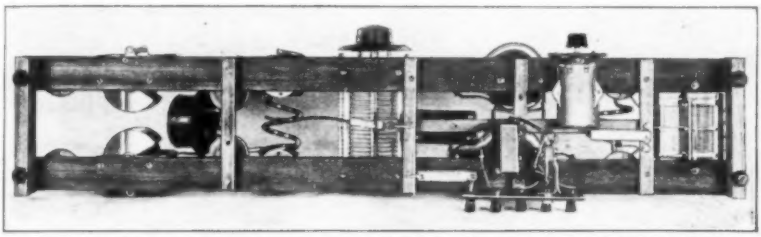
The two sections of such a condenser are in series across the tank circuit and the rotor is grounded. Since the rotor is at zero r.f. and d.c. potential to ground, the danger of shock as well as the serious detuning of the set when the dials are touched are eliminated. Moreover, the insulation of one section of the condenser is in series with the insulation of the other (across the high r.f. potential ends of the inductance) and the insulation is thereby made doubly effective. Since the two sections are in parallel with respect to the d.c., the d.c. flash-over voltage is the same as if a single-section condenser of the same plate spacing were used. It is usually r.f. voltage rather than d.c. voltage that breaks down condenser insulation, however, and a fixed insulating condenser between the rotor and negative high voltage will be adequate insurance against d.c. flash-over with standard types of tuning condensers.

The balanced tuning condenser is also advantageous in making possible the achievement of symmetrical connections within the tank circuit, since the leads between the condenser and the tank inductance both connect to the stator plates and can be made exactly equal in length. Such symmetry is difficult to obtain when one connection must be made to the stator plates and the other to the rotor (frame) of the condenser.

The total capacity across the tank circuit is approximately half the capacity of one section (since the two sections are in series) and a condenser of comparatively high capacity per section is necessary for high-C at the lower amateur frequencies. Since the balancing of the tank circuits is not so critical at the lower frequencies (below the 14-mc. band, say) it would be practicable to connect a single-section condenser in parallel with the balanced condenser to get the necessary high-C plate tank for these lower frequencies. The effective capacity range of the rebuilt National plate tuning condenser used in this set is from a minimum of 28 $\mu\mu$fd. to a maximum of 110 $\mu\mu$fd., measured with the condenser out of the set. This maximum gives a satisfactorily high-C plate tank at 28 and 14 mc. with Type '52 tubes in push-pull. The capacity range of the Cardwell grid-tank condenser is from a minimum of 45 $\mu\mu$fd. to a maximum of 275 $\mu\mu$fd., wiring and grid-filament capacities included.

The centers of the tank inductance are also at ground r.f. potential and are therefore the ideal points at which to make the d.c. feed connections to the grid and plate circuits. If the plate-supply and grid-leak connections were made exactly at the electrical centers of the inductances, there would be no necessity for radio-frequency chokes at these points. As insurance against the possibility that these connections may not be exactly at the voltage nodes, however, it is advisable to have r.f. chokes in the circuit as shown in the diagram of Fig. 4. The chokes are not functionally necessary and if the taps are carefully placed on the inductances they may be omitted.

The idea of electrical symmetry is also carried on into the antenna coupling circuit. The antenna inductance is split in two sections with the antenna ammeter connected between them. This places the ammeter at the point of maximum current (with symmetrical current distribution in the antenna or feeder system) which is advantageous in some ways — and disadvantageous in others. The advantages are the requirement for but one meter and the placement of the meter at a point of maximum impedance in the system. Radio frequency meters have a considerable amount of inherent impedance at very high frequencies and it is advisable to place the meter in a part of the circuit where this impedance can be least effective. The disadvantages of the arrangement are the necessity for two tuning condensers and their location at points of considerable r.f. potential. The latter disadvantage is principally noticeable when making tuning adjustments, since bringing the hands near to the condensers has a considerable detuning effect on the coupling system. Weighing the advantages and disadvantages seems to favor the arrangement shown in Fig. 4, although modification of the whole scheme might prove profitable.



D.C. AND LOW-FREQUENCY A.C. WIRING IS RUN BENEATH THE FRAME

The terminal strip, by-pass condenser for key, grid-leak and r.f. chokes are grouped beneath the tubes in the neutral area of the radio-frequency field.

The transmitter is intended for operation with a Hertz antenna fed by a two-wire tuned feeder system (Zeppelin style) and adaptation to other systems will require revamping of the coupling arrangement.

PRACTICAL CONSTRUCTION

The actual how-to-make-it part of this article has been reserved for complete recital in one piece because it has been found that the practical constructional details are not so readily dug out when they are tangled up with the theory and "why" which must also be given in a technical article. This arrangement should particularly suit those who have the habit of reading only the constructional parts of articles — and who often miss details which are not conspicuously set apart. (We have a wistful hope that some of these theory-dodgers have unconsciously absorbed a little of their pet aversion while hunting for the constructional information in the first part of the story.)

The simplicity and straightforwardness characterizing the layout of the transmitter are graphically brought out in the illustrations. The foundation for the assembly is a skeleton frame made of "printers' furniture." This wood is cherry impregnated with linseed oil and is obtainable at printers' supply houses and at most large printing plants. It comes in 36-inch lengths with one cross-sectional dimension of approximately $\frac{3}{8}$ inch and the other ranging from ap-

proximately ⅜ inch to 1⅝ inches. The side-rails in the transmitter are two pieces each 36" long and 1⅝" wide. The overall depth is 6½". The grid- and plate-tank condensers are mounted on angle-brackets bolted to the side rails, the grid condenser being a Cardwell "multiple," Type 156-B and the plate condenser a rebuilt National Type TM-450, the latter having Crolite insulation.

The Cardwell condenser is a standard multiple-type receiving condenser and needs no remodeling to adapt it to our purpose. The National transmitting condenser, originally a single-section affair, requires some remodeling to convert it to a two-section type. This is easily done, however, since changes in the stator assembly only are necessary. The stator is removed by taking off the nuts on the supporting rods and then unfastening the supporting Crolite insulators. The stator is completely disassembled and the rods are each cut in the center. Copper washers are soldered to the unthreaded ends of the six half-rods and the stator is reassembled with the center plate left out. The result is two separate stators, each supported by three rods held fast to the insulators by hex nuts. In reassembling the condenser, care should be taken to get identical spacing between the plates and proper alignment of the two sections. This can be done quite accurately by "sighting" across the plates and along the rods. When finally lined up, the plates should be tightened carefully. Too much tension will pull the rods out of the washers soldered to the ends but insufficient tightening will cause high-resistance contacts between adjacent stator plates. Long brass bolts of the proper length, diameter, and thread would be better than the revamped rods if they could be obtained.

A ready-made multiple-type condenser may be used if rebuilding is distasteful. The Cardwell Type 157-B and the General Radio Type 334-Z have approximately the same characteristics as the rebuilt National used in this transmitter and may be substituted in its place.

The fixed air condenser, C_4, is made up from the surplus stator plates of a National straight-line-capacity receiving condenser which had been double-spaced. These plates are stacked up triple-spaced with the same washers used as separators in the variable condenser of which they are relics. The end plates are pieces of bakelite and the supporting screws are 6–32 brass flat-heads. The total number of plates is 8 and the capacity is approximately 75 $\mu\mu$fd. Its breakdown voltage rating is approximately 3000 volts at 60 cycles. The condenser is shown "close-up" in one of the illustrations.

The spacing between the various pieces of apparatus can be determined with sufficient accuracy by studying the illustrations. The spacing need not be followed exactly, of course, but adherence to the layout in general is recommended.

The grid and plate inductances are supported on General Radio wall insulators and are fastened in place by bolting through holes drilled in the flattened ends of the copper tubing of which the coils are made. Clips are not used for making the center-tap connections to the coils but leads are permanently soldered to the inductances at their exact centers (as estimated by inspection). Most of the clips available are made of steel,

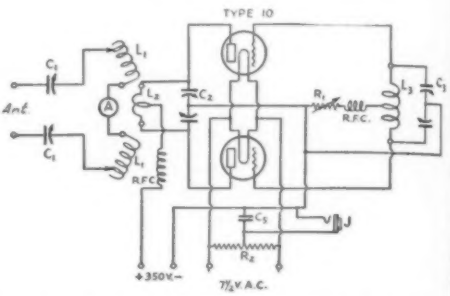


FIG. 5. — THE CIRCUIT SUGGESTED FOR TYPE '10 TUBES

All specifications are the same as those in Fig. 4 with these exceptions:

C_1 — 250-$\mu\mu$fd. receiving type variable condensers.

C_2 and C_3 — Same as C_3 in Fig. 4.

R_2 — 200-ohm center tapped non-inductive resistor. If center-tapped filament winding is used, this resistor may be omitted.

and become very hot in the intense field about a transmitter inductance. This heating is good evidence of losses — and we are trying to eliminate all the sources of loss. The clip is therefore put on the other end of the lead, where it will be out of the tank-inductance field. Specifications for the inductances are given under Fig. 4.

The grid leak is an Allen-Bradley Type E-210 Radioleak, and is fastened to a small bakelite panel on the front rail of the frame. A variable leak is used because it has been found that adjustable grid bias is advantageous in getting the best signal-quality and efficiency at very high frequencies. Adjustment of the grid bias is the final operation in tuning the transmitter and although it is not extremely critical, as a tuning refinement it is well worth having.

The radio-frequency chokes are designed for the 28-mc. band and are all identically alike. Each consists of 48 turns of No. 30 d.c.c. wire wound over a 2-inch length of wooden dowel ½ inch in diameter. The method of winding is to measure off 2" on the form and wind 24 turns per inch over the 2 inches, estimating the spacing at slightly more than the diameter of the wire. After the winding is completed, it should be doped with acetone or collodion to prevent the wire from slipping. Wood-screws through holes drilled in the forms hold the chokes in place on the transmitter. These chokes are satisfactory at 28 mc.

(*Continued on page 80*)

More Progress on 28 Megacycles

Complete Description of W2JN—Asia Works U. S. A.—Preparation for June Tests—Report on R.S.G.B. Tests

By **Clark C. Rodimon,** *Assistant Editor*

WE have received the photographs and diagrams of the successful 28-megacycle station W2JN, owned and operated by Mr. C. K. Atwater, Upper Montclair, N. J. Last month we mentioned the records this station and other stations have set up on 28 mc.

The radiating system at W2JN is a Zeppelin type antenna designed to operate at best efficiency in the 14-mc. band. It is a horizontal wire 98 feet long and 30 feet high running in a N.W. by S.E. direction. It is excited at the north-westerly end by a 2-wire 48-foot transmission line which is spaced ten inches between wires. At 14,200 kc. the antenna operates at its third harmonic while the transmission line is three quarters of a wave in length. When operating on 28,400 kc. the same antenna is used but a change in the free leg of the feed line is made in order to maintain a voltage node at the antenna coil. At the point "X" (shown in antenna drawing and photograph) this feed wire is opened, thus making the length from the base to the dotted line equal to approximately three quarters of a ten-meter wavelength. The radiating part of the system is thus changed, in effect, to an "L" shaped antenna with a vertical component of 24 feet and horizontal length of 98 feet. The complete

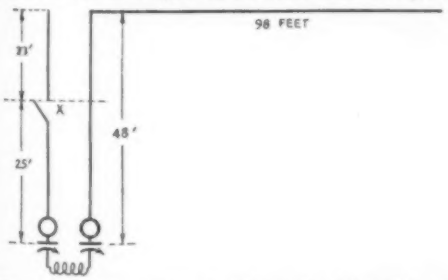


FIG. 1.— THE 28-MC. RADIATING SYSTEM AT W2JN. NOTE THE SWITCH AT "X." SEE TEXT

radiating system for 28 mc. has a total of 3½ standing waves, making it radiate around the 7th harmonic.

The antenna location is not a particularly favorable one. It is over level ground and about 200 feet above sea level. From the house a view of New York City sky-line may be had, twelve miles to the east. About one mile west there is a small mountain ridge which rises to about 500 feet in elevation, though this does not seem to hinder the propagation of signals in a westerly direction as equally good reports are received from this direction.

ANTENNA SYSTEM AT W2JN

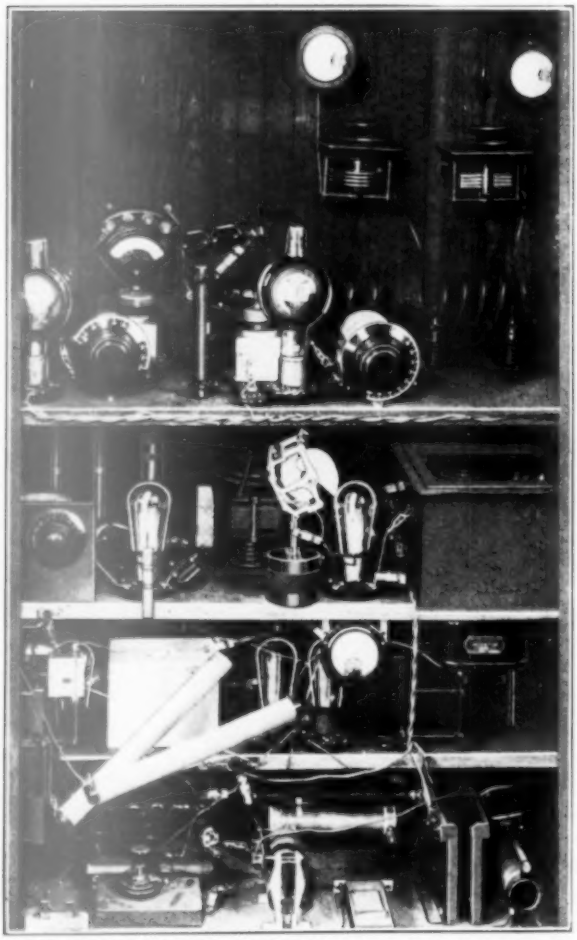
The antenna is only 30 feet high and is horizontal for 98 feet. The point "X" marks the spot where the switch is located in the free leg of the Zepp. As mentioned in the text this switch is opened for 28-mc. work thus adding 24 feet to the length of the antenna; this portion being vertical. The remote control wires are cabled and may be seen running from the shack up the antenna pole and into the house.

The receiver used at W2JN is the conventional untuned r.f. antenna stage, detector and one stage of audio amplification. The r.f. stage is shielded from the rest of the set and the complete receiver is enclosed within a brass 1/16″ shield, 15″ long, 7″ high and 8″ deep. The component parts and specifications may be noted from the diagram. W2JN originally started business on the 28-mc. band with a self-excited rig. It is with this transmitter that the Atlantic Ocean was first spanned in 1928. The antenna used then was a half-wave Zepp with a quarter-wave feeder. We are reproducing a diagram of the antenna along with the self-excited transmitter.

The transmitter in use at present is crystal controlled from a 1775-kc. quartz plate. Frequency doubling to 3550 kc. is done in the plate circuit of the oscillator. The next doubler is on 7100 kc. which in turn doubles to the next tube which is on 14,200 kc. For 28,400-kc. work another stage is added and tuned to that frequency. This transmitter is completely described by the diagram and cut label of Fig. 4.

W2JN is remotely controlled from the house. The transmitter is located in the building at the far end of the antenna.

This transmitter is also used for operation on the 7000-kc. band. It is accomplished by the use of a Type '60 screen grid 75-watt tube which is run as an r.f. amplifier on the same frequency as the Type '10 7-mc. stage. When the excitation is switched from the 14-mc. doubler to the 7-mc. amplifier the last two Type '52 tubes are not in use.



COMPLETE REMOTELY CONTROLLED 28-MC. TRANSMITTER AT W2JN

The transmitter is housed inside a closet and door closed after all tuning adjustments are made. On the lowest shelf are a couple of transformers and resistances, not to mention a condenser or two. The second shelf holds a power transformer, rectifier tubes, chokes, resistances, meters and r.f. chokes. The r.f. equipment starts on the third shelf, starting with the crystal oscillator. The crystal is temperature controlled and is within the box at the extreme right. The first doubler is also on the third shelf along with the tuning equipment for this stage. The top shelf holds the last two doubler stages — the final stage ending on 28.4 kc. The final tank coil and condenser are at the right of the right hand tube. Alongside the tank of this stage may be seen the antenna coil and above this coil are mounted the series antenna tuning condensers with r.f. antenna meters.

XU2UU WORKS W6BAX

From several sources we learn that XU2UU and W6BAX were QSO on March 9th. We believe this to be the first communication between Asia and U. S. A. on 28 mc. XU2UU uses an input of about 15 watts and the antenna is one designed for work as a ½-wave Hertz for 14-mc. operation. A single wire feeder is used.

GENERAL

Except for the above item we have had no reports of new records this past month. Conditions appear to be holding up and it seems that each week-end there are a few new hams who try out the band for the first time. To the newcomers on the 28-mc. band we want to give all the encouragement we can; one should not be disheartened if results are not forthcoming at the first crack. Stick at it and you will be amply rewarded.

W1ZL, one of the original 28-mc. experimenters, is still active and his latest report mentions working England during the R.S.G.B. 28-mc. tests. The transmitter has a Type '10 tube and is self-excited and until just recently a non-directive antenna was being used. This station has just completed a simple half-wave directive antenna, Zepp fed.

W1AQD is back on 28 mc. with a pair of Type '52's in push-pull.

W1PI is active on 28 megacycles with a Type '10 transmitter.

W2ALS is testing at noon daily on 29,000 kc. Transmitter is an m.o.p.a. with a Type '60 in final stage.

VE2AC has been carrying out some transmission tests on 28 mc. daily with a half-wave directive antenna. A Type '52 is used in the self-excited transmitter at VE2AC.

W6BXV reports working K6ALM on March 16th. As far as we are aware this is the first work between the mainland of U. S. A. and Hawaii. G5HJ was heard by W6BXV during the British tests.

W8DCI reports that G5WK is ready to go on 28 mc. at all times. W4NH has an automatic xtal transmitter on 28.4 mc.

JUNE A.R.R.L. 28-MC. TESTS

As announced in May *QST*, the A.R.R.L. is sponsoring world-wide 28-mc. tests on all week-ends in June. For those who did not notice the dates we will repeat again that the tests are on May 31st–June 1st, June 7th–8th, June 14th–15th, June 21st–22nd and June 28th and 29th. It will be seen that this covers Saturday and Sunday of each week during June.

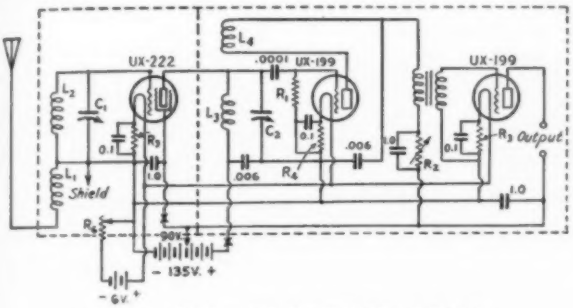


FIG. 2. — THE 28-MC. RECEIVER AT W2JN

L_1 — 4 turns No. 16 wire 1" diameter.
L_2 — 4 turns No. 16 wire 1" (spaced).
L_3 — 3 turns No. 16 wire 1" (spaced).
L_4 — 4 turns No. 16 wire 1" (spaced).
C_1 — 5-plate Cardwell Condenser.
C_2 — 5-plate Cardwell Condenser.
R_1 — 5-megohm metallic resistor.
R_2 — Frost 200,000-ohm variable resistor.
R_3 — 10-ohm fixed resistor.
R_4 — 25-ohm fixed resistor.
R_5 — 25-ohm fixed resistor.
R_6 — 25-ohm variable resistor (located outside the set).
Points marked "X" have r.f. chokes inserted. They are made up of 50 turns of No. 30 wire spaced on a form 1" in diameter.

Sections of the I.A.R.U. have been notified of these tests and many stations have written in signifying their desire to enter the tests and inquiring for more information on antennas and transmitters. This issue of *QST* has plenty of information on transmitters and rectifiers.

W1XZ–W1AXV at South Dartmouth, Mass., will be active during the coming tests.

W1SZ will use the transmitter featured on the cover of this month's *QST*, and described in detail elsewhere in this issue. The antenna will be a half-wave directive affair.

All stations desiring to enter these tests should not hesitate because they are under the impression that special hokus pokus charm apparatus is necessary to perk on 28 mc.

May *QST* has been out less than a week as this is being written. However, we have encouragement from several sources, informing us that they would be going strong during the tests and most of the hams mentioned the fact that the simple reflector, as mentioned last month, was made use of. Amateurs who are going to enter these tests would do well to seriously consider the use of a directive antenna. There has been very little experimenting with directive antennas by amateurs. We want to hear of results (good or bad) from users of directive antennas.

During the past month we have had several reports from Australian amateurs who appear to be on every week-end and besides hearing other Aussies each week, they hear west coast U. S. A. signals and XU2UU. We originally heard there were a dozen active Australian stations on the 28-mc. band but from later reports we make a newer estimate of at least two dozen.

Well, gang, it's up to us now. All the skids have been greased. Father Heaviside has promised to shift his layer around to our best advantage and OM Static doesn't get a look-in on this band of frequencies. Some hams may be worried as to the whereabouts of ten meters when making the plug-in coil. About the easiest method we have found is to hook up a simple detector oscillator working on 20 meters and cut and try with our coil until the second harmonic is picked up. Then again, different commercial harmonics will be heard just below the 28-mc. band. Therefore, one need not waste time worrying whether he is around 28 mc. or not for when one approaches it, something will be heard: If it isn't an amateur signal it will be a commercial.

Furthermore, don't listen for five minutes and become discouraged because no signal is heard — the band is wide and the amateurs are scattered all over this 1000-kc. band at 28 mc.

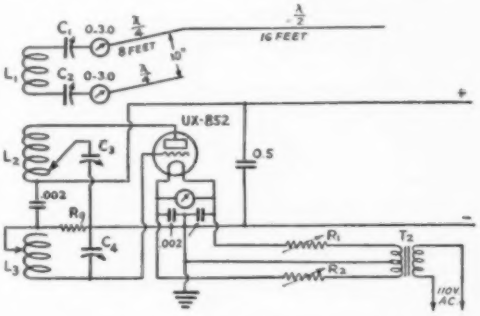


FIG. 3. — THE ORIGINAL 28-MC. SELF-EXCITED TRANSMITTER AND ANTENNA SYSTEM AT W2JN

L_1 — 5 turns of copper tubing 3¾" diameter spaced.
L_2 — 5 turns of copper tubing 3¾" diameter spaced.
L_3 — 1½ turns of copper tubing 3¾" diameter spaced.
No r.f. chokes were necessary.
R_3 — 20,000-ohm Ward Leonard resistor.
R_1 and R_2 — R.C.A. rheostats.
C_1 and C_2 — G.R. 50 μμfd. variable condenser.
C_3 — Cardwell 150-μμfd. double spaced condenser.
C_4 — National 150-μμfd. double spaced condenser.

Here's wishing you all the greatest month of rolling off DX minus the QRM and QRN that you have ever experienced — and with any power, regardless of how low.

EXCERPTS ON R.S.G.B. 28-MC. TESTS

We have scant reports on the outcome of the 28-mc. tests held by the R.S.G.B. as reported

(*Continued on page 64*)

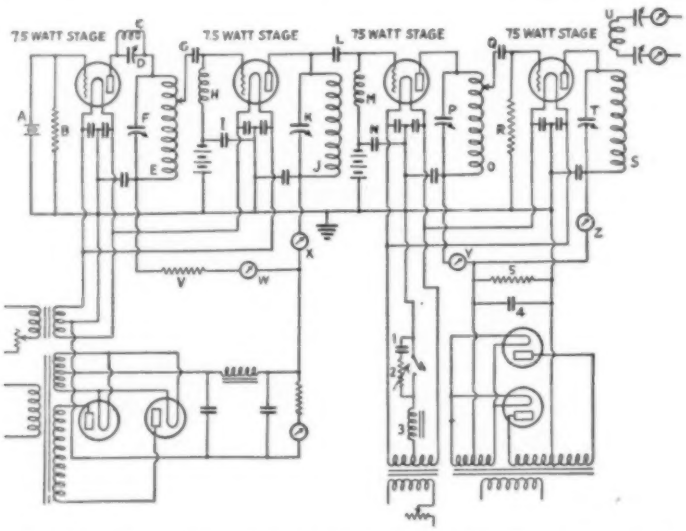


FIG. 4. — COMPLETE DIAGRAM OF CRYSTAL CONTROLLED TRANSMITTER ON 14.2 AND 28.4 MC. USED AT W2JN

A — 1775-kc. quartz crystal. Kept in Constant Temperature Oven.

B — 50,000-ohm grid bias resistor (wire wound Super-Davohm).

C — 40 turns No. 20 S30 wire on 2¾" form.

D — 250-μμfd. variable condenser to tune coil C to the frequency of the crystal to sustain oscillations of same.

E — 9 turns No. 16 s.c.c. wire 3" diameter, spaced the width of a turn.

F — 250-μμfd. variable condenser to tune coil E to second harmonic of crystal frequency, or 3550-kc.

G — .001-μfd. Sangamo condenser.

H — Small Pacent duo-lateral choke, 5/8" OD by 3/8" inside diameter.

I — 1-μfd. 500-volt condenser.

J — 6 turns No. 16 s.c.c. wire 3" diameter, spaced the width of a turn.

K — 250-μμfd. variable condenser to tune coil J to 7100-kc.

L — .0005-μfd. Sangamo condenser.

M — 60 turns No. 26 d.c.c. wire on 2" diameter form, close wound.

N — 1-μfd. 500-volt condenser.

O — 5 turns of ¼" copper tubing spaced ¾" 3" diameter.

P — 15-μμfd. variable condenser to tune O to 14200-kc.

Q — 2 .001 Sangamo condensers in series.

R — 50,000-ohm Ward-Leonard type AK resistor.

S — 6 turns of ¼" copper tubing 4" dia. spaced ½" for operation on 14,200 kc.

*S*¹ — 3 turns of ¼" copper tubing 3" dia. spaced 1¼" for operation on 28,400 kc.

T — 100-μμfd. variable condenser to tune coil S or S¹.

U — 10 turns of ¼" copper tuning 4" dia. spaced ½" for operation on 14,200 kc.

4 turns of ¼" copper tuning 3" dia. spaced 1" for operation on 28,400 kc.

V — 25,000-ohm (5 Ward-Leonard type 507-S resistors in series) to reduce 680-volt supply to 180 v. at .020 amps. for crystal oscillator tube.

W — 0–100 milliammeter.

X — 0–100 milliammeter.

Y — 0–100 milliammeter.

Z — 0–250 milliammeter.

NOTE. — UX-852 tubes are used in the last two stages because of their low grid to plate capacity of 3 μμfd. When operating on 10 meters, frequency doubling system is used throughout. When operating on 20 meters, LC circuits PO and TS are both tuned to 14,200-kc. but no neutralization is used. Sufficient grid excitation to final stage is had by tapping low on coil O. Some regeneration is present which is desired, but it is not enough to make the circuit unstable.

1 — 1-μfd. condenser.

2 — 1750-ohm variable resistor.

3 — 3-Henry choke coil.

4 — 2-μfd. high voltage condenser.

5 — 100,000-ohm resistor (large type) to lower the peak voltage.

The rectifier tubes for the Type '10 tubes are Type '81. Those for the high voltage stages are Type '66.

Experimenters' Section

COUPLING THE SINGLE-WIRE FEEDER ANTENNA TO A PUSH-PULL TRANSMITTER

THE problem of coupling a push-pull transmitter to the type of antenna described in September, 1929, *QST* has proved bothersome to a number of amateurs. One way to do it is to couple a tuned tank circuit to the oscillator and tap the feeder on the coil in the separate tank.

There is another method, however, and curiously enough, it was suggested almost simultaneously by two different experimenters, Vincent S. Roddy, WSDJV, and James J. Callahan, W9FGQ. It simply involves the use of two separate feeders, each placed the proper distance from the center of the antenna, but on opposite sides. The idea is shown in Fig. 1, the antenna in this case being designed for the 7000-kc. band.

Both feeders should be exactly the same length, otherwise the phase relationships in both halves of the antenna will not be correct. It is also important that the feeders be tapped at points equidistant from the node on the tank inductance. They should also be kept as far apart as possible, and as far from surrounding objects as space will permit.

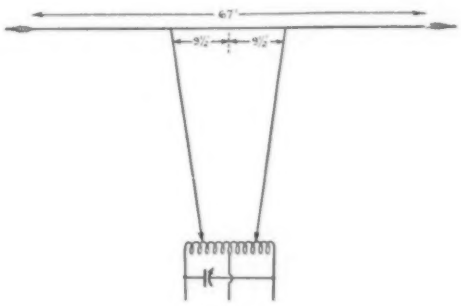


FIG. 1

This method of feeding, while simple, is theoretically correct, because the polarities on the antenna will be in correct relationship so long as the precautions mentioned above are observed. Neither of our correspondents mentioned how well the method works when the antenna is operated on a harmonic but it should be at least as efficient as with the single feeder.

CONCERNING THE BIBLIOGRAPHY

About a year ago it was announced that the formal organization of the Experimenters' Section had been discontinued, and that instead of distributing outlines of the various problems and references to periodicals and textbooks in which material on those problems could be found, the policy would be adopted of going over one of the major problems each month in these pages, and appending a bibliography covering all available references on the subject. This has been done, and to date the following problems, constituting the most important of those confronting us, have been considered:

May, 1930 — Crystal Control.
April, 1930 — Frequency Measurement.
March, 1930 — Amateur 'Phone Transmitters
February, 1930 — Constant-Frequency Transmitters.
January, 1930 — Audio-Frequency Selectivity.
December, 1929 — Radio-Frequency Chokes.
November, 1929 — Tube Characteristic Data.
September, 1929 — Loop Transmission and Reception.
August, 1929 — Keying Methods.
July, 1929 — Portable Transmitters.
June, 1929 — R. F. Amplifiers for Amateur Bands.
May, 1929 — Antenna and Feeder Systems.

Included in the above list are just about all the problems which are causing us any trouble at the present time. Continuance of the policy stated above will simply mean duplicating material which has been published previously, with such additions as may have occurred during the year. The question naturally arises as to whether the bibliographies are sufficiently valuable to our membership to justify the use of the necessary space in *QST*, or whether that space could not be more advantageously used in presenting ideas and kinks which experimenters find useful. We incline to the latter, and are therefore discontinuing the publishing of bibliographies except when there appears to be a real need or demand for them on particular problems. If we have guessed wrong, and the present bibliographies are actually proving valuable to experimenters, nothing would please us more than to be informed of that fact.

The work of the Experimenters' Section is entirely informal. Your name does not have to appear on the membership list to make you eligible to contribute. Worthwhile contributions are welcomed from all sources — and whether an idea is worthwhile or not is not always a matter which the originator should decide. We often receive contributions from writers who mention that "so-and-so was the one who really thought of this, but was too modest to send it in" and that particular idea may have been something which

(*Continued on page 64*)

I.A.R.U. NEWS

Devoted to the interests and activities of the

INTERNATIONAL AMATEUR RADIO UNION

President: H. P. MAXIM *Vice-President:* C. H. STEWART *Secretary:* K. B. WARNER

Headquarters Society:

THE AMERICAN RADIO RELAY LEAGUE, Hartford, Conn.

MEMBER SOCIETIES

American Radio Relay League
Asociacion E. A. R.
Associazione Radiotecnica Italiana
Canadian Section, A.R.R.L.
Deutscher Amateur-Sende-und Empfangsdienst
Experimenterende Danske Radioamatorer
Nederlandsche Vereeniging voor Internationaal Radio-amateurisme
New Zealand Association of Radio Transmitters
Norwegian Radio Relay League
Radio Society of Great Britain
Reseau Belge
Reseau Emetteurs Francais
South African Radio Relay League
Wireless Institute of Australia

Conducted by A. L. Budlong

IT is still impossible to present the final results of the returning votes from the member-societies regarding the matters taken up in the December Calendar, particularly regarding the election of new members, which is of most specific interest.

— - - - —

As promised last month, we are presenting the DX time table furnished by Al Giddis, W1ABG. These lists are timely, having been compiled for the months of June, July and August, regarding which we have had little previous information. Here they are:

14,000 kc.

(Time given E.S.T. and G.C.T.)

NORTH AMERICA	
Labrador-Newfoundland	12:00 noon–8:30 p.m. (1700–0130)
Cuba-Porto Rica-Jamaica-Virgin Islands and Costa Rica	6:00 p.m.–10:00 p.m. (2300–0300)
Mexico	4:00 p.m.– 8:00 p.m. (2100–0100)
Northwest (scarce)	9:00 p.m.–12 midnite (0200–0500)
SOUTH AMERICA	
Brazil	5:00 p.m.–12 midnite (2200–0500)
Ecuador	8:00 p.m.–12 midnite (0100–0500)
Paraguay-Peru-Fr. Guiana	6:00 p.m.–10:00 p.m.(2300–0300)
Argentina-Chile, Uraguay	7:00 p.m.–12 midnite(2400–0500)
(South Americans slightly weaker around 10:00 p.m. but much easier to copy due to absence of QRM.)	
EUROPE	
England, Ireland, Scotland	1:00 p.m.– 8:00 p.m. (1800–0100)
France, Belgium	12:00 noon–10:00 p.m. (1700–0300)
Sweden, Denmark, Netherlands	1:00 p.m.– 9:00 p.m.(1800–0200)
Italy, Spain, Portugal, Germany, Poland and Russia (the latter scarce)	3:00 p.m.– 7:30 p.m. (2000–0030)
Hungary	9:00 p.m.–10:30 p.m. (0200–0330)
(Most Europeans are loudest between 4:00 p.m. and 7:00p.m.(2100–0000)	
AFRICA	
Algeria, Tunis, Sahara, Egypt	2:00 p.m.– 8.30 p.m. (1900–0130)
Cameroons, S. Rhodesia	5:00 p.m.–10:00 p.m. (2200–0300)
S. Africa	5:00 p.m.– 8:00 p.m. (2200–0100)
ASIA	
Iraq	4:00 p.m.– 7:00 p.m. (2100–0000)
Japan (very scarce)	7:00 p.m.–10:00 p.m. (0000–0300)
OCEANIA	
Hawaii, Philippines, (not so numerous!)	5:00 p.m.–12 midnite (2200–0500)
Australia, New Zealand	11:00 p.m.– 2:00 a.m. (0400–0700)

— - - - —

Some more achievements are called forth in the way of WAC. L. A. Paul, VK3LP, sends us a radiogram telling of working all continents in four and one-half hours on Feb. 11th. The stations worked were G5YG, XU2UU, FO8SR, W8UF, OA4J, KA1JR.

— - - - —

Then comes L. E. Dutton, now down in Florida with W4MK and W4XQ, who recalls that, while at 9EZ during the contests in 1928, he worked all five continents on 40 meters for five consecutive nights, and a short time afterward worked all continents on 20 meters for four nights within one week.

(*Continued on page 70*)

The Communications Department

F. E. Handy, Communications Manager
E. L. Battey, Asst. to Coms. Mgr.
1711 Park St., Hartford, Conn.

Second Roumanian Arctic Expedition

XORC to Contact Amateurs — Bassett of W6BSB Chosen as Operator

ON July 1st the Second Roumanian Arctic Expedition sails from Cherbourg, France, for Greenland for a stay of one year. A study of meteorological, aerological and radio conditions in the Arctic will be made by Dr. Constantine Dumbrava, the Roumanian explorer, who has already made four tripe to Greenland. Dr. Dumbrava is convinced that a daily plane service between the United States and Europe is practical over the Arctic route. The Fast Air Transport Co. of Canada in accord with this belief will send a plane over the proposed route late this summer. There are no water jumps of over four hundred and fifty miles.

An expedition must carry a complete stock of the necessities of life as well as scientific apparatus and repair parts. This makes even a small expedition a costly project. Little does the world realize the tremendous value it receives. To maintain contact with the world, radio facilities will be available. A four-cylinder Fairbanks Morse gas engine will operate a 32-volt farm lighting plant and also run the 110-volt 60-cycle 1500 v.a. Esco generator, making it possible to use standard plate and filament heating transformers for the radio equipment.

The largest transmitter will be a Hartley using four 75-watt tubes operating on 23.65 (12,680 kc.) meters and 40 meters (7500 kc.). Another 75-watt transmitter will also be available for amateur work. The third outfit is a 15-watt fone set for operation on 50 meters (6000 kc.). This will be used for communicating with the plane.

The plane will use a pair of 50-watters on about this same frequency. A self-rectified circuit will be used to reduce weight and make it easy to follow the signal.

Four receivers will be available, a 150 to 550 kc. for receiving foreign press and meteorological data, one medium frequency set for broadcast work, one plane receiver covering from 6250 kc. (48 meters) to 4000 kc. (75 meters) and the receiver for the high frequency work is a new DeForest set type CS5 using two screen-grid tubes and two type 01A. It consists of one stage of a periodic R.F. followed by a screen-grid regenerative detector and two stages of audio amplification. This covers a range of 15 to 200 meters and has several features making it an ideal receiver for the work.

Burgess batteries will be used for the receivers and 'phone transmitter, due to their long life and ability to stand the cold climate.

It is our aim to contact *reliable* amateurs to facilitate the handling of our personal messages. The amateurs putting the most consistent signal into our base will be favored with the traffic. This does not mean that we shall not work other stations. If at all humanly possible, we will work every one we hear calling us whether we have traffic or not. Auroral effects are expected to play an important part in the transmission and reception of signals, so all those interested should not think we have slighted them if we fail to answer their calls. An award will be made to the amateur performing the greatest service for the expedition and I assure you it will be worth striving for.

During the period between the months of March and November conditions are best for work on about 14,000 kc. and from November to March on 7000 kc. As far as known now, we will be on 23.65 and 40 meters. Our first schedule will be with VAY (Cape Hope's Advance, Que.) on 23.65 meters August 15th 5:00 p.m. Eastern Standard time (7:00 p.m. Greenland time). There will be contacts with six European countries and with some of the U. S. Geodetic Survey boats expected in that territory this late summer.

We shall exchange QSL cards with everyone worked. Address cards to "The Second Roumanian Arctic Expedition, care Explorers' Club, 544 Cathedral Parkway, New York City.

The operator and constructor of the apparatus is H. L. Bassett of Oakland, California, and a member of the well known Oakland Radio Club of that city, also W6BSB and W6SS. Calls are yet to be issued by Denmark for the transmitters. All interested should listen for "XORC." This call will serve until further data is given in *QST*.

— *H. L. Bassett, W6BSB, Operator.*

Why Keep a Log?

By E. H. Gibbs*

THE matter of keeping a log is one phase of good amateur operating practice which has remained virtually unchanged since the beginning, yet the number of stations today without logs is surprising. Not many ORS are guilty, however, for a good log is absolutely vital to traffic work. Some system of recording station activity is a necessity regardless of the type of work (or play) indulged in.

When an operator fails to keep a log, he not only robs himself of something interesting and valuable, but also does his fellow amateurs an injustice as well. From his log he should be able to check back for the signal report that his DX or experimenter friend wants so badly, or determine the exact hour that he took that important rush message from W7COD. If he cannot do these things, he should be branded slipshod, in the other fellow's mind.

The traffic man needs an accurate check on messages handled, a record of reliability of QSO with a certain station or locality, and a place to note frequencies and hours of scheduled stations.

The DX man wants a record of his QSO with the other ends of the earth, with a complete report of the other fellow's signal. Even though said other fellow does not QSL, a neat and complete log is pretty good evidence of contact, particularly when backed up by a station with a 1930 signal.

A serious experimenter would have great difficulty in drawing accurate conclusions from results that were never recorded. He must note the details of every change made in his circuits and their constants, and the performance of the layout.

Even the fellow who just "chews the rag" and makes

* W8AQ, W1AAC.

friends through his contacts is the more likeable for knowing that he has worked you before.** If he had a log well suited to his uses, he could call you by your personal "sine" and comment on the last QSO and happenings since then.

In addition to the comments, it may be said that the logless station owner misses one of the game's greatest thrills — the kick that comes from spending an otherwise dull hour or two looking over logs of by-gone years.

Practically every one of us is a combination, in varying proportions, of DX hound, traffic man, experimenter, and rag-chewer. For this reason it would be a difficult task to design a log for the vast majority of amateur stations.† In the matter of logs, then, it's every man for himself, and the devil take the ham who doesn't think enough of his station to keep a log of its activities.

** One consistent operator we know keeps a complete and accessible card file of stations worked in addition to a station log and obtains much enjoyment from reference to the conditions or subject matter of the first contact on subsequent QSO's.

† Suggestions regarding the design of station logs are given in the *Radio Amateur's Handbook*.

Traffic Briefs

W9UM suggests that one of the factors most likely to be overlooked in the quest for a steady note is the house wiring and the capacity of the pole transformer supplying electricity to the set. Plenty of current can be had through "number of 14's" of the house wiring to light the filaments and to run the motor-generator and supply magnetizing current to the plate transformer — but what about the drain on the line when the key is pressed? Perhaps it would pay to get in touch with the local power company and determine if the transformer supplying your particular section of the distribution system is large enough to care for the load that your set and all of the neighbors' flat irons, washing machines, etc., put upon it. Generally the power company men are as keenly interested in efficient regulation of their systems as you are.

— - - - —

Joshua J. Joninger wrote in the other day with the following query: "When a radio operator says he is going to send a message *blind*, does that mean that the operator on the other end cannot see it?" This is a tough one — we can't say *blind* because almost none of our communication is by sight. Therefore, Josh, old terrapin, we should amend the statement to read: "When one operator is compelled to send a message without the acknowledgement of the receiving operator, such messages should be designated as one which is sent *deaf*."

— - - - —

W8DME, an Official Broadcast Station, was pleased and surprised the other day to receive a tape record of one of his broadcasts from PY1IB of Brazil.

— - - - —

NN1NIC requests that the gang listen for him on his old frequency of 9090 kc., as he has difficulty in working through on his 7000-kc. band frequency.

— - - - —

Just to prove that the 1750-kc. band is occupied, W9CRN made a list of the stations he had worked there in a little over a year. When he had finished, he had 350 calls chalked up — and all of this done with a transmitter using 201A tubes. We understand that W9AWE did the same thing and had over a thousand. Come on, boys — what's the matter with the 1750-kc. band? Let's go back up there and enjoy some of those old-time rag-chews and some of the home-like local QSO's that used to be so easy back in "the good old days."

— - - - —

When the U. S. S. *West Virginia* was in Panama Bay, W6AM accepted messages from the wives, sweethearts, and friends of the officers aboard. During three months several hundred messages were transmitted from W6AM and received aboard the battleship without acknowledgment. When it was impossible for any reason to receive a message, the battleship wired W6AM for a repeat on some ensuing schedule.

— - - - —

VE1BM claims that low power is the easiest and cheapest means of obtaining the much-coveted "1930 type" signal. With "high C" (a high ratio of capacity to inductance), a UX210, and 150 volts of direct current from B batteries, his note is one that is praised by all who work him.

— - - - —

In addition to misusing QSR, some operators likewise misuse QSB. W8APQ says: "When I tell some stations 'QSB' they come back and ask why I mention their notes when I have already given them 'pure d.c.' reports. On top of that, some of them have the nerve to ask 'QSS?', although there is no longer any such Q signal."

— - - - —

W2VY worked WQBG, a yacht lying in Nassau Harbor, Bahama Islands, and was requested by the operator to call Peekskill, N. Y., by telephone. This was done, and the operator of WQBG was informed by his wife of the time that she would arrive in Miami to meet him. FB!

— - - - —

We were surprised to receive news the other day that W9CRW during a recent cyclone suffered the loss of his pants, which were torn from him by the high wind. There was a sum of $20 in the pants, too, but this was insignificant when compared to the fact that the antenna towers of WRHM were entirely demolished and the transmitting building (aw, g'wan — *shack* is the proper name) was blown off so far that it has not yet been found. W9CRW was fortunate in losing only his pants, and not his health with them. A newspaper headline recounting other details of the same storm bears the following hair-raising news: "3 Horses Take to Air in Storm; Creek Blown Away" . . . Whew!

— - - - —

When W6BTX worked W6YG, the physics instructor in a California high school, W6YG asked him to send a quart of water from the Great Salt Lake, to be used for testing and analysis. W6BTX sent the water and later received a radiogram acknowledging receipt of the quart. FB for amateur radio!

— - - - —

HIGH QUALITY SIGNALS

Every amateur takes pride in the audibility of his signals. He should take equal pride in the quality! We cannot all have the loudest signal on the air, but we can have a *high quality signal* if we so desire. It may take time and many adjustments but surely our efforts will be for the good of all.

What is the definition of a High Quality Signal? It must be a steady signal. It cannot be a.c., i.c.w. or other pure type. It must be clean-cut. There can be no ripple, no backlash and no key clicks. Any amateur can judge a received signal. He can also judge his own signal . . . *by the use of a monitor*.

To obtain a High Quality Signal you must use a certain amount of money, and a larger amount of brain work. Most downfalls of good signals come with the alibi, "What's the use of having a high quality signal? As long as I get out, I don't care about anything else." This excuse has no grounds to stand on and, the less it is used, the better all signals will be.

Any c.w. or 'phone amateur whose call is listed in *QST*'s "High Quality Signal" list should feel justly proud of his signals. Let us hope that the number of "proud" amateurs will increase each month.

— *R. L. Sakkers, W8DED*

— - - - —

While QSO W9GDM one night, Mayer, K4KD, discovered that W9GDM was located a few miles from his old home town. W9GDM called Mayer's home on the 'phone, got his father on the line, and a two-way conversation between father and son ensued. As K4KD has been away from home for ten years, every one concerned got quite a kick out of that QSO. K4KD and W9GDM now keep a weekly schedule, which beats the mails by seven days!

The following "Famous Last Words" are quoted from the February issue of the *Oscillator*, published by the A.R.R.C. of Los Angeles:

"I haven't got any license yet, but I'll only operate a little while and nobody'll get wise."

— - - —

If properly adjusted and operated, a low-power station will work just as efficiently as a high-power rig. For three months or more W4UM has been keeping a daily schedule with VE4BU on the 14,000-kc. band. Both stations are using UX210 tubes. This schedule has proven most consistent and is very commendable, especially in view of the power and frequency used.

— - - —

We all remember old u2UO operated by the New York *Times*, and the brute-strength signal that came from it. The call 2UO changed hands some time ago, and W2NH tells us that the new W2UO is using a UX-199 with 150 volts from a "B" eliminator.

— - - —

The following headline appearing in the Dayton (Ohio) *Daily News* is furnished through the courtesy of W8DBK: "Port William Bank Robbed By Amateurs." This gives us quite a jolt until we read on and find that they were not "radio amateurs," but rather "amateur bandits." Hi.

— - - —

From the Personnel Office of the New York Stock Exchange and K4KD we receive the report of the exchange of scores covering a rifle match held between the teams of the Stock Exchange and the University of Porto Rico at Rio Piedras. K4AKV (Ponce, P. R.) took care of the Porto Rico end, and W8CPC (Buffalo, N. Y.), managed the New York end. The line-up for both teams was exchanged, and when final scores were available, Lieutenant Robertson, in charge of the University team, telegraphed them to K4AKV, who passed them on to W8CPC. W8CPC in turn telegraphed the results to the Exchange. The Stock Exchange team won the match with a score of 3648 to 3172. In addition to this match, the Exchange has used amateur radio for a number of other matches. W9EAJ relayed scores to W7GL in a match shot against a team in Jerome, Idaho. Scores have also been exchanged in matches shot with teams in Montreal, Canada; Worcester, Mass.; Chicago, Ill.; Houston, Texas, and other cities.

— - - —

Use of the early morning hours for operating — or schedules held at any time when interference is light during the day — will make possible dozens of pleasant contacts you may be missing now. Low power men especially will find the odd operating hours better for rolling up enviable records.

— - - —

DX is far from dead on 3500 kc. On November 26 W1AZW worked W5APG, W6CSU, W7UN, W8CYP and W9PW in that band all inside of *one hour!*

— - - —

When summer comes, many of the fellows move to the 14-mc. band in order to escape the QRM and QRN that are so prevalent on some of the other more commonly used bands. Another consideration leading many toward increased use of the 14-mc. band is the "unimportance of the power" consideration — the fellow with the 7½-watt tube seems to stand about as good a chance for everything as does the fellow with a water-cooled tube. Many stations can be worked after darkness falls (in spite of rumors to the contrary). A significant fact is that the 28 mc. fellows make most of their arrangements for tests and contacts via the 14-mc. band. It's an ideal band for summer work — you're missing something if you don't use 14 mc.

— - - —

The beginning amateur is, of course, anxious to get on the air. He wants to rush his transmitter in the process of building, so that he can get on the air and work somebody. (We know, for we used to be beginners ourselves.) But the fellow who takes time and puts everything together in the best fashion is the fellow who will be farthest ahead a year later. If it is necessary to wait a few weeks for those filter condensers, let's take the time to do it. When we finally get that transmitter put together *as it should be*, then we can go on the air proudly. And in this day the fellow with the clear-cut, pure signal is respected!

We are pleased to announce that W8CYK, who has been prominent in amateur activities in Western New York, graduated recently from the Communications Course in Air Craft Radio at the United States Army Air Corps Technical School at Chanute Field, Rantoul, Ill., with a grade of 93.89, the second highest ever attained in the school. FB!

— - - —

W6BAX claims that he has recently worked all continents within 48 hours. WAC inside of two days!! This is something to shoot at, fellows. And W6BAX says he used only 45 watts input, too.

— - - —

Webb of W4NE remarks on how tiresome it is to listen to some of the bunch prepare to sign off. "Best DX, best of luck, cuagn, best 73 (the *best* is superfluous, for 73 means *best regards*), hope to QSO agn, blah, blah, blah, etc." As Webb says in his letter, "73 itself covers a lot of territory and should be sufficient. Let's make an effort to eliminate all that other superfluous stuff, and make our operating more snappy."

— - - —

To improve the speed and dependability of amateur traffic handling, G. L. Graham suggests that individual amateurs select dependable stations well within range, and at various points of the compass, arranging schedules to suit all concerned often enough to keep the hook clear, keeping the frequency of each station fixed and observing the hour of the schedules most faithfully. Of course, each station in the net should endeavor to originate traffic for the other cities concerned so that some real worthwhile traffic activity can be built up. The whole system stands or falls on the character of the operators selected to coöperate in this plan and their ability to be on the job. The "5-point system" detailed in these columns some four years ago embodied this idea and time has shown that the idea is entirely practical and workable. Go to it, OMs.

— - - —

The following, which was read at the Roanoke Division Convention held at Charlotte, N. C., in March, is addressed to "the members of the American Radio Relay League," and comes from the Director of Naval Communications, Captain S. C. Hooper. Captain Hooper has an amateur station and is on the air signing W3NL.

The Navy is particularly interested in the amateur, and its organization, the A.R.R.L. Representing the Navy, I wish to take every opportunity to impress this interest upon the membership.

During the World War it was necessary to expand the radio personnel ten times, and such measure of expansion will be necessary in any war. The radio personnel called to the colors must be qualified in operation, naval procedure, code and cipher work, use of Naval calls and frequencies, and in fact must be trained in the habit of Naval communications the day they are mobilized. It is impossible to accomplish this training except through a well drilled Naval Reserve. Funds will never be available to adequately train a reserve in peace time, except through the medium of a Volunteer Reserve, in which the Navy contributes only the opportunity, certain pamphlets and some instruction. Such a reserve is now under way.

For a volunteer organization to be successful, it must be built upon a solid foundation, first, the desire for the individual to perform at reasonable, but slight self-sacrifice, patriotic service in memory of the debt each owes those who have gone before; second, the work must be interesting and of value in perfecting the individual in something worth while. This latter is true of amateur work generally, otherwise the A.R.R.L. would not have prospered and survived these many years.

Therefore, the Navy has chosen to build its Volunteer Reserve on the foundation of the A.R.R.L., to rely on its members for service, its directors for advice, and any suggestions from this body will always be most welcome indeed.

The amateur has pointed the way for progress in the past, and will do so in the future.

— *S. C. Hooper, W3NL*
Captain, U. S. Navy,
Director of Naval Communications.

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
W6AD	124	193	789	1106
K4KD	468	31	730	884
W1MK	98	114	608	820
KA1DJ	379	188	130	697
W8YA	92	111	473	676
W2BC	615	—	11	626
W3DH	91	25	504	620
W9COS	92	176	350	618
KA1HR	244	88	268	600
W2QU	255	321	16	592
W6ERK	27	128	430	585
W3BWT	93	123	328	544
W9BN	259	145	124	528
K4DK	468	10	10	488
W2FN	14	55	394	463
W8BN	84	56	318	458
W1CMZ	73	22	318	413
W6DEP	43	42	316	401
W6EIB	20	26	350	396
KA1CM	207	113	70	390
W6HM	97	281	4	382
W2CXL	42	25	303	370
W6WA	115	164	67	346
W6AKW	56	24	250	330
W8DSP	30	49	246	325
W9DRG	200	109	6	315
W5WW	9	40	261	310
W6AKD	4	17	280	301
W3ZF	42	73	186	301
W8BJO	66	20	210	296
W8CNO	25	23	234	282
W8DYH	12	13	254	279
W2BUW	12	262	—	274
K6EWB	—	—	271	271
W9BJA	26	38	198	262
W1AZD	164	4	93	261
W9EJQ	1	14	228	243
W2LU	29	22	182	233
W6ASH	19	16	190	225
W8DLG	15	16	192	223
CM8UF	187	13	20	220
W6ALW	11	7	198	216
W3BF	115	48	51	214
W4RP	35	48	130	213
W1TL*	28	39	145	212
W6QP	74	23	106	203
W6BZY	11	41	150	202
W1BXB*	16	42	144	202
W1CGX	32	14	154	200
W9EF	43	105	46	194
AC8HM	116	66	6	188
W9DJK	44	62	80	186
W5AOD	20	62	84	166
W2QN	70	83	4	157
W6AOA	33	53	68	154
W1RV	14	55	84	153
W3PM	42	57	42	141
W2JF	15	58	61	134
W1BKR	55	52	16	123
W2ANV	24	50	30	104
W6FE	38	51	—	89
W9BCA	24	59	—	83
W1TL	155	30	232	417
W1BXB	11	40	216	267

The several amateur stations responsible for the best traffic work — the ones that are "setting the pace" in worthwhile traffic handling — are listed right up near the top of our B.P.L., the figures giving the exact standing of each station accurately.

All these stations appearing in the Brass Pounders' League are noted for their consistent schedule-keeping and dependable message-handling work in amateur radio. Special credit should be given to the following stations in the order listed responsible for *over one hundred deliveries* in the message month: W2QU, W6HM, W2BUW, W6AD, KA1DJ, W9COS, W6WA, W9BN, W6ERK, W3BWT, W1MK, KA1CM, W8YA, W9DRG, W9EF.

Deliveries count! A total of 200 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 50 or more *deliveries* will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify *you* for B.P.L. membership also?

*Omitted from May *QST*.

When a party in New Jersey was unable to conduct urgent business with a friend in Peking, China, by cable, he turned to amateur radio. W2JN gave the 84-word message to W6CUH, who QSP'ed to K1HR within 24 hours for direct relay to China. This is just another star in amateur radio's crown. Snappy stuff, OMs!!

W6CUH recently had an odd QSO with HC1FG. The owner's sister was at the key and spoke nothing but Spanish. A 45-minute rag chew ensued (entirely in Spanish), and W6CUH was kept hopping to keep up with her rapid-fire Spanish, as she handled a key as well as the language. Hi. You did well, OM!

At the time the *Graf Zeppelin* was in Japan prior to its flight to Los Angeles W6CBW was QSO J7LL, who was located near the field where the *Zepp* was sheltered. The Jap could look out of his window and see the *Graf* being hauled out of its hangar to be groomed for its trip. He told W6CBW of the beauty of the scene — how the long, low silver shape shone in the moonlight. That is something new — a picturesque QSO!

Traffic handlers — what do you think of W6TM's ingenious method of securing message boxes for filing his traffic? He got an old hard rubber, 12-volt storage battery case from which the plates had been removed. All that he did to make it ready for use was chip off the several small ridges that protruded from the bottom of each compartment, and then paint it to make the appearance neater. The finished product is an indestructible case, having six compartments just the right size for message paper. The various compartments are labeled, "Originated," "Delivered," "Relayed," etc. Sounds good, eh?

W1MK

A.R.R.L. Headquarters' Station W1MK operates on frequencies of 3575 kc. and 7150 kc. Robert B. Parmenter, "RP," is the chief operator; his fist is familiar to most of the amateur fraternity. Occasionally other members of the Headquarters' staff operate at W1MK. Their personal signs may be found in the QRA Section of *QST*.

Throughout the following schedules Eastern Standard Time will be used.

OFFICIAL AND SPECIAL BROADCASTS *are sent simultaneously on 3575 kc. and 7150 kc. at the following times:*

8:00 p.m.: Sun., Mon., Tues., Thurs., and Fri.

10:00 p.m.: Mon. and Fri.

12:00 p.m. (midnight): Sun., Tues., and Thurs.

GENERAL OPERATION periods have been arranged to allow every one a chance to communicate with A.R.R.L. Headquarters. These general periods have been arranged so that they usually follow an *official* broadcast. They are listed under the two headings of 3500 kc. and 7000 kc. to indicate whether the watch is devoted to listening on the 80-meter band or to the 40-meter band.

3500 kc.

8:10 p.m. to 9:00 p.m. on Sun., Mon., Tues., Thurs., and Fri.

10:00 p.m. to 11:00 p.m. on Tues. and Thurs. (No OBC sent before these periods.)

12:00 p.m. to 1:00 a.m. (or later) on Sunday night (Monday morning).

7000 kc.

10:10 p.m. to 11:00 p.m. on Sun., Mon., and Fri.

12:00 p.m. to 1:00 a.m. on the following *nights* (actually on the morning of the day following): Mon., Tues., Thurs., and Fri. (*Only* on Tues. and Thurs. does the OBC precede these periods.)

SCHEDULES are kept with the following stations through any of which traffic will travel expediently to A.R.R.L. Headquarters, on 3500 kc.: W1ACH, W1AQD, W1BOD, W1BXB, W1ZA, W2JF, W3BWT, W3ZF, W8ARX, W8CEO, W9OX, VE2AC, VE9AL; on 7000 kc.: W4SK, W5PA, W6CIS, W6DEP, W6OJ, and W9DFY.

Traffic Briefs

VE4EC, SCM of the Alberta Section, advises that a Hamfest will be held at Edmonton on July 1st. Prizes will

be given for code speed and various other contests, and a "big time" is planned. A nominal charge of $2 will be asked of each ham who attends. Write to Mr. Barron, Suite 2, Warwick Apts., Edmonton, Alberta, for reservations.

FOX RIVER RADIO LEAGUE HAMFEST

The Fox River Radio League extends a cordial invitation to all amateurs to attend its third Annual Hamfest to be held at Aurora, Ill., on June 21st and 22nd. A real "get-together" is planned and a good time is promised to all who are there. Write to Mr. J. A. Stoos, W9DTC, Sec'y-Treas. F.R.R.L., Naperville, Illinois, for full particulars.

Official Broadcasting Stations

CHANGES AND ADDITIONS

(Local Standard Time)

W8HD (3659 kc.) Mon. 8:00, 9:00 p.m.; Sun., 12 midnight.

W9BVP (3740) Tues. 7:00 p.m.; (7060) Thurs. 10:45 p.m.; (14,100) Sun. 10:00 a.m.

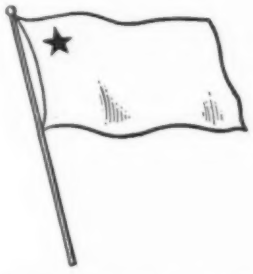
W5AJL (7240) Tues., Thurs., Sat. 8:00 p.m.; Sun. 11.00 a.m. and 3.00 p.m.

Traffic Summaries

(MARCH–APRIL)

Pacific led by Los Angeles	11,126
Atlantic led by Western Pennsylvania	4918
Central led by Ohio	4682
New England led by Eastern Massachusetts	4287
Hudson led by Eastern New York	4245
Southeastern led by P.R.-V.I.	3369
Midwest led by Missouri	2853
Dakota led by Southern Minnesota	2221
West Gulf led by Southern Texas	1649
Delta led by Tennessee	853
Roanoke led by North Carolina	774
Northwestern led by Oregon	711
Rocky Mountain led by Colorado	258
Quebec	224
Ontario	131
Prairie led by Saskatchewan	102
Vanalta led by Alberta	94

765 stations originated 10,881; delivered 9426; relayed 22,049; total 42,497. (94.25% del.)



Los Angeles comes back strong this month and again claims the Traffic Banner! This Banner goes each month to the section with the largest total of *real* messages. A traffic summary showing the standing of the various divisions for the past month is printed above. What place does yours take? What Section will carry the Banner next month and help its Division head the list?

Due to an error in last month's summary, Arkansas was given as leading the Delta Division instead of Louisiana Louisiana led the Division with a total of 455.

DIVISIONAL REPORTS

ATLANTIC DIVISION

SOUTHERN NEW JERSEY — Acting SCM, Bayard Allen, W3ATJ — Our SCM, W3BWJ, has left the state and is busy installing the squawkies. He has left me temporarily in charge. Please coöperate with me in the matter of reports, fellows; the percentage of reporting stations to active stations in this section is disgracefully low. Whether you are an ORS or not, please report every month. W3DH, the Princeton University station, with the aid of eight skeds twenty-seven times a week, makes the BPL for the first time in five years. FB. W3ASG has installed a 100-watt 85-meter fone. W3ATJ only snared 5 QSOs with 4 continents giving that total. W3AWL is working in the southern part of the state, and will be on with a portable this month. W3BAN is a new station at Eayrestown.

Traffic: W3DH 620, W3ASG 45, W3ATJ 5.

EASTERN PENNSYLVANIA — SCM, Don L. Lusk, W3ZF — Spring and static now seem to be the general complaint rather than handling traffic. W3QP signed off for a couple of months; guess Jack thought about the YLs and flowers and forgot radio. Too bad, OM, but I know how 'tis. W3AUR says DX on the 14-mc. band is improving. W3APH is a newcomer, and is certainly welcome. The 15th of each month is the reporting date, OM. The SCM almost fell over when he got a report from ole W8EU — yep, he's back again. We regret to report that because of illness, W8VD has to cancel his ORS temporarily. W3FY reported enough traffic this month for a non-ORS. W3AKB evidently has the OM and spring fever combined. W8CWO is back again — he spent a couple of months in Chicago and had a very fine trip. W3LC is getting out nicely now that he uses a MG set. W3MC heard the Pilot Bermuda plane when it was forced to land. W8AWO complains of amateur Haters. We must acknowledge a report of 15 off-frequency reports from our Official Observer W3MC, who has done some mighty fine work in this section. We welcome into amateur radio W3AQQ; here's wishing you fellows luck and plenty of traffic. Don't forget the convention at Erie, fellows. The SCM hopes to be on hand and sign up a few ORS prospects. W3ZF has a new superhet perking nicely.

Traffic: W3ZF 301, W8CWO 126, W8EU 40, W3LC 34, W3MC 33, W3AUR 33, W8VD 32, W3FY 31, W8AWO 19, W3AKB 11, W3APH 8.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Forrest Calhoun, W3BBW — It looks as though the summer "rest" period is starting early this year. Quite a few of the gang forgot to report this time. We can't get that banner that way. So let's make another stab at it. What say, OMs? Maryland: W3CGC leads this state by a big margin. He is QRL track work at J. H. U. W3LA reports some DX but not much traffic. W3AFF sent in a nice report and says he is putting in remote control to the cellar for the summer. He also reports W3WF has a new B/C set, so is only on once in a while. Hi. W3ON is a new one and is waiting for a tube. Let's hear from you, OM. W3BBW is experimenting with A.C. S/W receivers, also changing the shack around a bit. W3AOO, a new ORS, has done some fine work using only 2 201A's. W3DG handled some traffic for a change. Keep it up, OB. W3GF wants his ORS put in storage while he tries his hand at commercial operating. OK, OM, it shall be and hope you join us soon again. W3NY blew his rectifiers while trying to get his 250-watter going, but has new ones now. W3PQ reports some success with a.c. receivers. The SCM had a visit from W6ZZG, who is portable station of W6AEF. Also had W3CAB call on me. W3DQ, ex-5ANJ, is starting up in Baltimore. Delaware: W3ALQ is the lone star of the state this time. He reports two new hams at Seaford, W3ABB and W3BAR. Let's hear from you two. District of

Columbia: Due to an error on my part in April *QST*, W3AWM, who handled quite a few, is listed as W3AHM. The error is regretted. We continue to have our RM, W3BWT lead in traffic. He says no shut-down during the summer. FB. W3BF was chased down some on the band by off-wave fones. He was visited by W3OE. W3PM made the BPL on deliveries. FB, they also expect to get on 14,000 soon. W3ASO sent in a report covering three months, handling 79 messages. W3OZ was also visited by W3OE. He has quite a few nice skeds and should do some fine work. W3CDQ, who is a new OBS, lost her antenna in a storm, but is on again now. W3AKR just reported his traffic. Let's have some news, OM. W3GT has just returned from a tour of Central America as op on AB6. He is now trying for a WAC on 14,000 kc.

Traffic: W3BWT 544, W3BF 214, W3PM 141, W3CGC 87, W3OZ 53, W3LA 39, W3AFF 17, W3BBW 12, W3CDQ 10, W3AOO 8, W3AKR 7, W3ALQ 6, W3DG 6, W3GF 5, W3GT 1.

WESTERN PENNSYLVANIA — SCM, A. W. McAuly, W8CEO — W8YA again leads with a fine total. They work on both the 3500- and 7000-kc. bands. W8DLG plans to keep a five-point system of schedules going during the summer. W8CUG relayed a message from Rio de Janeiro to Princeton, N. J., in fifteen minutes. W8CFR is still in Brazil, but will be home by the time this gets into print. It takes 21 days to get his report from Brazil. W8CMP is keeping seven schedules. W8DUT says that his schedules are wobbling. W8AGO has a new junior op. W8AMU has put up a new antenna. W8BQR is a new station in State College. He is also one of the ops at W8YA. W8BWL sends in a nice total. W8KM is a new ham in Altoona. W8CB, operated by W8VI, is the new Juniata College station. Uniontown is represented by W8DKS and W8BZE. W8ASE is now using a 250-watter. W8AVY has grown from 15 watts to 50. W8APQ won the Section Certificate in the Sweepstakes. He is looking for a schedule with Pittsburgh. W8BEY has got himself a new OW. W8ARC is doing his bit in the A-A net. W8AJE says the new regs are FB. W8GU is on 28 mc. The rest of the Erie gang are on 14,000 kc. trying for foreign DX records. W8BHN is busy with plans for the Convention. Let's all try to attend this year. It looks good. If you do not see your station or vicinity mentioned in the section reports, it is because no one sends in a report to the SCM. Mail letters and cards on the 16th of the month.

Traffic: W8YA 676, W8DLG 223, W8CEO 55, W8CUG 40, W8CMP 20, W8DUT 13, W8AGO 6, W8DKS 6, W8BGW 6, W8AMU 2, W8ARC 3, W8APQ 62, W8BQR 57, W8BZE 35, W8BWL 25, W8CB 18, W8AVY 13, W8ASE 2.

WESTERN NEW YORK — Acting SCM, John R. Blum, W8CKC—W8DSP leads the list with 325. W8BJO is right behind with 296. W8CNX handles plenty of messages on the SRO band. W8ABQ has a new Hi C. W8TH now has 60 cycles at the shack, and notes a great improvement. W8TZ gets an ORS. W8AFM reports good coöperation from all off-frequency stations he notified. W8CHG has a beautiful xtal xmitter on 14 mc. W8CPC just returned from California. W8ALY and W8AZL have had some luck on 56 mc. W8CHI handles traffic. The Utica gang had a FB hamfest and banquet April 5th. The Atlantic Division Convention will be held at Erie June 27th and 28th. Plan to attend! W8DII states that traffic is on the blink. W8BJO received his "blue ticket." W8TH is working on a portable for summer camping. W8CNX is preparing for season on Great Lakes. W8DSP won the Sweepstakes Certificate for Western New York. W8QL has cancelled all schedules. W8OA is keeping a number of schedules. W8BHK reports weather conditions poor. W8CDB asks the gang to listen for W8CO, his station aboard a big cabin airplane. W8CO works on 7000 kc. W8DME is rebuilding to use 'phone on 14 mc. W8CSW had to drop all schedules because of sickness. W8BYD-BAV sent in a mighty fine report of Jamestown activities. Station W8AVM was one year old April 13th. W8AWM has resigned as Secretary of the Jamestown Amateur Radio Association. W8BAV at Lincoln High School, Jamestown, is off the air. W8BIF is building a screen-grid receiver. W8BUT has moved to 3500 kc. W8BYD is coming back on with a 201A on 3.5 mc. W8CIL is on 7 mc. W8CLB has a new power supply. W8CXI, an old-timer, is back on the air on 7 mc. with an 852. W8CMN has been very sick recently. Ex-W8DGI now has his new call, W8CUC. W8BGV reports. W8NW is pounding out much better with a new antenna system. The Jamestown Amateur Radio Association is growing by leaps and bounds. W8BQB, the first CW ham in Jamestown, is now located in Warren, Pa. The Radio Association of Western New York held its annual meeting and dinner at the Sagamore Hotel, Rochester, April 26th. A pleasant evening was spent by all present.

Traffic: W8ABQ 1, W8CKC 14, W8CSW 19, W8DME 22, W8CDB 40, W8BHK 148, W8OA 147, W8BJO 296, W8QL 28, W8DSP 325, W8BGV 36, W8CNX 61, W8TH 4, W8DII 27.

CENTRAL DIVISION

ILLINOIS — SCM, F. J. Hinds, W9APY — Any station handling traffic may send in his totals to the SCM and help our state total. W9FCW has been appointed Army-Amateur station for his locality. 14,000 is still bringing in foreigners consistently at W9BRX. W9LL is revamping the receiver. A new receiver is coming out at W9CKM. W9BVP has radiogram service for the company with W9AKZ — only personal messages. W9CKZ says the R. I. was down, and all 12 taking the exams passed FB. W9BLL complains of QRN getting worse. W9FDJ is rebuilding to stop BCL QRM. YLitis is bad at W9FVO, but he will soon be on 20. W9BNI is working on a crystal-control outfit and will soon use 210, 865, 203A and 852's. W9EEN, W9EYA and W9CNY are the only hams in town and are all going 100%. W9GV is back home from Honolulu. W9KA is moving again. 180 volts on 171A with "B" batteries is the power at W9ACU. A policeman neighbor of W9GIV grounded the sky wires at W9GIV with No. 8 wire. Hi. W9FPN is mostly on 14 mc. The Morton High School Radio Club will soon poke a hole in the ether with a new 75-watt outfit. W9CKO is the new call at the Downers Grove High School Radio Club, of which W9GJJ is president. W9BMQ built a new shielded set, but the old 'phone ringers still come in to QRM the dials. W9CUH says he is now on 20 for the summer. W9DJ will send baseball scores to W9CSS, who is oping on WPBE on the lakes this season. W9EF has moved into Illinois — thanks to him for our large traffic totals this month. Hi. W9EF has been QSO Rawson's Yacht WQDI, and now has his WAC certificate. W9EJO is batting off traffic in spite of getting ready for college. W9BZO has a new screen grid with full a.c. operation, and no hum. W9AFN has a 210 with which he is working better than the old 852. W9BVV is using remote control and has a new 40-meter Zepp. W9AFF is still busy with speech amplifier work. W9DAX has a report from W6ARM stating his fone was heard on the west coast. W9BEO has rebuilt his 'phone on 165 meters and is getting out FB. W9GCD has a new water-cooled job. FB. W9DZM is helping the 129th infantry at Sycamore get started with A-A work. A new 500-watt 'phone crystal set is going at W9DZM-W9EKZ. W9ERU claims the world championship for most foreign countries with least contacts. W9FFQ is getting out well too. W9BXB is coming along in great shape again. W9ASY has a new screen grid ala April *QST*. Static has been the chief drawback at W9AKA this month. W9BPT worked all districts and 75 stations his first two weeks on the air. FB, OM. W9ENQ has gone to 20. W9ANX blew the filter. W9DLV reports fine DX using two 201A's in a Hartley. W9DSS says SO is going from bad to worse for the summer. W9BDW has now worked eleven countries. DX is improving at W9ANQ. W9FUR QSO'd WFBT.

Traffic: W9EF 194, W9BVP 120, W9DZM 117, W9BLL 65, W9CKM 65, W9DKK 60, W9FCW 52, W9GV 44, W9EJO 43, W9BZO 38, W9DOX 30, W9BNI 26, W9LL 25, W9APY 24, W9ASY 23, W9AKA 21, W9ANQ 20, W9AD 18, W9ERU 18, W9CKZ 16, W9CZL 16, W9FDJ 16, W9GIV 16, W9CUH 14, W9DSS 14, W9AFN 13, W9PA 12, W9AMO 10, W9FVO 9, W9GJJ 8, W9ACU 7, W9BDW 7, W9BMQ 7, W9KA 7, W9CNY 5, W9KB 5, W9FOV 1.

INDIANA — SCM, D. J. Angus, W9CYQ — W9RW is experimenting with xtals, ants and amps. W9RE has changed his QRA to Muncie. W9AJH wants skeds and traffic. W9GGJ has joined the 65th Corps A-A net. W9BKJ is busily engaged in grinding xtals, and will have one if the

supply of blanks holds out. Leo Wilcox at Fort Wayne has blossomed out with a new call, W9BHM, after a few years off the air. W9BJK has a portable, low power in operation for code instruction for beginners Monday, Wednesday and Friday. W9AEU is the new set in the Fort Wayne N. G. armory. W9ETH blew his 50-watter, but gets out just as well with a 210. W9AXI is putting in an a.c. receiver. W9AAI is putting in an xtal in order to keep his fone in the band. FB. W9CVX is still xtal-controlled even though his xtal has dwindled down to the size of a pea. W9BWI is rebuilding his phone set so it will be bigger and better. W9AET is putting in xtal. W9AKJ wants skeds with Indianapolis and S. Ind. W9FYB reports "we expect a new ham soon." W9ENX got across his plate voltage and nearly forgot to let go. W9EBU is going at Connersville again. W9FCG is back on the air again. W9DZX and W9EGE-W9GCO are being badly QRMd by the YLs. W9EF has moved to Calumet City, Ill. W9GJS installed a UX250 and a new rectifier, and is burning up the air on 7200. A U.S.N.R. communications unit is being organized at Purdue University this month. Section 3, 9th Naval District, won the cup awarded to the section showing the greatest relative growth during the year. This section comprises Indiana. A U.S.N.R. communications unit is in the process of being formed at Michigan City. W9AOO has a new 866 rectifier and 50-watter. W9CIC is on U.S.N.R. skeds regularly now. W9CNI has a new outfit, 2 210's and rectobulbs on fone. W9EPH reports that W9FXM has returned from the hospital. He will be back on 7000 kc. before long. W9BZZ, W9CMQ, F9FXO have new a.c. receivers. W9CWS is going to L. I., N. Y. W9EPH keeps skeds with W5AQY, W8MV and VE4RR on 7135 kc.

Traffic: W9DSC 8, W9CIC 8, W9DDG 76, W9AKJ 56, W9GGJ 44, W9GCO 41, W9AET 44, W9DBJ 10, W9BKJ 16, W9FYB 3, W9FCG 10, W9CHC 28, W9AIP 26, W9ENX 4, W9AHB 3, W9GJS 23, W9CYQ 16, W9EPH 25.

KENTUCKY — SCM, J. B. Wathen, III, W9BAZ — Any Ky. ham who missed the 'Fest at Covington — well, just ask anyone who *was* there. W9OX cuts loose and puts his mark on "The Pint" for him and two for W9AZY. The latter is also QSA5 in six continents. W9FZV is hanging an ORS tag on the shack wall. W9BWJ and W9ARU got all their traffic on 7 mc., thus proving it can be done. W9BXK is still trying to persuade the xtal to perk. W9GGB has a sked with ex-W9CRD. W9EYW is trying out 14 mc. W9CEE is now pushed by MOPA; results FB. W9AIN has another pink ticket. W9ENR is getting DX and traffic. W2ZE now has a WE212D. W9DDQ is plugging away for his ORS tag. We are expecting big things from W9EGO. W9EQO has scarlet fever. W9BAN is installing a new rect. and filter as per Uncle Samuel. W9FKM was bit by the DX bug but, we are glad to say, has recovered. Gangway YLs, here comes W9BAZ in his new "can," collecting reports. Kentucky has many more active stations who never report. Don't be like that; people won't like you! How about the fones? Get your skeds fixed up for the coming hot weather. W9AUH is working on 28 mc. Sundays during May and June.

Traffic: W9OX 165, W9AZY 79, W9BAZ 70, W9DDQ 52, W9BWJ 34, W9BXK 33, W9FKM 31, W9ENR 25, W9ARU 18, W9FZV 18, W9CEE 13, W9AUH 7, W9BAN 5, W9EYW 5, W9AIN 4, W9ZZE 4, W9GGB 2.

MICHIGAN — SCM, Dallas Wise, W8CEP — W8DED reports Army traffic going good although warm weather has slowed up things some. W8DYH has been working both 3500 and 7000-kc. bands and leads the traffic handlers this month. He is now sending his code practice lesson Sunday a.m., 11:00 to 11:45 E.S.T., on 3600 kc. W9EQV says he is too busy to pound brass. W8AEQ reports spring housecleaning cut the total this month. W8CU has a new monitor and is now working on a three-stage MOPA transmitter. W8DDO is working on 7000 now, but says things are slow. W8ASO has the outfit perking again. W8BRS has been rebuilding and sure has a nifty little outfit there now. W8DYH and W8CEP dropped in to give it the once over. W8ZF has been having hard luck getting licensed ops to run the station, but has great hopes. W9AXE is another who is rebuilding, and now has the set going on 14,000 kc. W8ACB has changed over to MOPA, but hasn't tried it out as yet. W9EGF says the air is punk up that way. W8CKZ is plugging away as usual. W8AUB has the television outfit in operation and has had some fair results. W9GJX is having good luck on 14,000 and says to save her a WAC certificate. W8PP has purchased a crystal and will rebuild the outfit into a crystal-controlled job. Ex-W8BAX has come to life with a new call W8DHM and will be on soon with a couple 210s and a crystal. W8BGY won a certificate in the Sweepstakes, but reports no traffic. W8BAA has been on with an old 202. W8COW has one of the new Aero tuners and is busy rebuilding the receiver. W8WO is having lots of fun with 14,000 fone. W8CEP hasn't been on much, but is working on a new 7000 crystal-controlled job. The gang at WYE have been out on the coast with the Army in the Mimic Warfare there, so no report for this month. W8DMS, W8CAT, W8CEP, W8DYH and W8VT have been busy getting things ready for the coming ham-fest at Ypsilanti. W8WF is busy remodeling the fone set.

Traffic: W8DFS 49, W8DED 41, W8DYH 279, W9EQV 10, W8AEQ 30, W8CU 9, W8DDO 22, W8ASO 23, W8BRS 22, W9AXE 23, W9EGF 12, W8CKZ 28, W8AUB 4, W9GJX 20, W8PP 27, W8BAA 2, W8CAT 45, W8CEP 5, W8COW 12, W8WO 4.

OHIO — SCM, H. C. Storck, W8BYN — A lot of you have been neglected and, perhaps, some reports will not get into this report. Business forced me to get behind in correspondence and then April 1st, I left Columbus to work in Dayton and since then have been very busy. As soon as work slacks up, I will get at it and answer letters until this old mill wears out. W8RN is with us again and makes the BPL two ways. He leads Ohio, but on the same card he states that he will leave again this summer. W8CNO comes next and is the only other making the BPL. W8BAC has been having luck with DX on 14,000 kc. W8NP, the faithful, turns in a round 71. His name is North, and he says NP stands for North Pole. W8DDF was home for a week and earned 56 messages. W8APC blew most of his filter condensers, and says too many skeds are being cancelled. W8CFT reports activity with DX. W8HH reports conditions on 700 kc. rotten in daylight. W8BKM says he is using a couple of 866s and gets xtal reports, also that W8CIY has fallen for the women. Hi. W8DU is ex-W9GKI, and will be an ORS as soon as I can get around to him. Welcome, OM. W8AQ won the Sweepstakes trophy for Ohio. Congrats, OM. W8BDU is another who is anxious for ORS. W8TK deplores the lack of traffic and asks how he can make the BPL without it. W8CSS built an a.c. receiver and says it's FB. W8ADU again kicks through with a total. We'll make a traffic "amn" out of her yet. Hi. W8ATL says Cleveland has gone 'phone. W8DPF reports a steady schedule with a YL, but expects to do a lot of brass pounding during his vacation. We are glad to hear that W8BBR is improving tho he will not be able to do much on the air for some time yet. W8CX also asks about his ORS appointment as he wants to buy a pin. Buy it, OM, you've earned it, and will get the appointment soon. W8BBH has a good crystal rig going and is in the market for schedules. W8ARW is running two sets now, one on 'phone. W8EJ is busy installing Police Radio System. W8ADS has been too busy with work to be on much. W8DIH has been experimenting with low power 'phone. W8DDQ is to have some new ops soon when school starts up again. W8DBK was on the air only a few days, but is now going strong. W8IF is going to install MOPA and perhaps xtal later on. W8BZL sent in a nice bunch of signal reports. W8CRI is pretty busy with school, but has a little time for RM work. W8LI has not had much time for traffic either, but expects to do things when school lets up. W8PL reports things pretty dead. Do you know that for the February-March period, 34 out of 35 stations reported with traffic, that we led the Division, and Ohio is second in the list? FB very, and keep up the good work. W8BYN is off the air for the present but expects to be on with something, somehow soon. Plans are under way for the convention here at Dayton sometime this fall, probably in October.

Traffic: W8RN 458, W8CNO 282, W8BAC 92, W8BYN 86, W8NP 71, W8DDF 56, W8APC 43, W8CFT 33, W8HH 31, W8BKM 30, W8DU 25, W8AQ 22, W8BDU 22, W8TK 22, W8CSS 20, W8ADU 18, W8ATL 18, W8DPF 18, W8BBR 12, W8CX 11, W8BBH 10, W8ARW 9, W8EJ 8 W8ADS 7, W8DIH 4, WDDQ 3, WDBK 3, W8IF 2.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9EBO is sticking in the 20-meter band pretty consistently lately, doing a lot of DX and trying to get a WAC. W9DTK is building an a.c. receiver. W9BWZ is keeping four schedules, and is out after the guy that has been using his call, and off-wave at that! W9SL says DX has been good the past month — a glance at his totals seems to confirm it. W9FAW had tough luck this month — ruined a plate transformer and three 210s. W9ESZ has installed rectobulbs with excellent results, and will be on 20 during the summer. W9OT says QRM is bad on 40 and 20 has gone haywire. W9VD has finished his tuned R.F. screen grid receiver and will be heard consistently from now on. Five new fellows are going at Racine, W9AGX, W9CCG, W9CBF, W9AFS and W9FAF.

Traffic: W9EBO 71, W9DTK 65, E9BWZ 34, W9SO 27, W9FAW 9, W9ESZ 6, W9OT 5, W9VD 4, W9DJK 186.

DAKOTA DIVISION

SOUTHERN MINNESOTA — SCM, J. C. Pehoushek, W9EFK — The hamfest season started off with a bang at Duluth the 19th of April with a large attendance including W9AIR, W9DHP, W9BLG-VE4BT, W9AMK, W9BNN and W9EFK from So. Minn. Due to the Duluth gang's hospitality, coupled with perfect weather, a peach of a time was had by all. It is a great pleasure to sit down and find all reports here every month. FB gang. The Division is planning on Sunday morning get-togethers on 7000 from the sound of things at the Duluth Banquet. Get on, fellows, and QSO in our own Division. W9COS leads the section with a terrific total, closely followed by W9BN and W9DRG. W9BNN of Heron Lake is going on the road for the summer, but will be on stronger this fall. W9BKX held an inauguration and christened his new xmitter. W9GHO is on with 100 watts and BCL trouble. Hi. W9DSH is chief at WRHM now. W9EYL is on 14,000 most of the time. W9BXE at Snelling was detailed on special duty, manicuring the golf course. Hi. W9BNF and W9DBC operate occasionally. W9AIR will be on the lakes this summer. W9BLG-VE4BT is on 14,000 in Minneapolis and getting out nicely. W9EAT says that ex-W9BCN is now W7CE of Evanston, Wyo. W7CE sends 73s to the Minn. gang. He is on 3.5-mc. 'phone. W9FLE is too busy to be on much. W9BQF is completing 3 xmitters for all bands. W9BHZ, W9GGA and W9DMA are all on regularly. W9DGE is back on the River. W9YC has been working good DX.

Traffic: W9 COS 618, W9BN 528, W9DRG 315, W9BNN 63, W9BKX 53, W9GHO 14, W9DSH 11, W9EYL 9, W9BXE 7, W9BNF 8, W9AIR 5, W9BLG 4, W9DBC 3, W9EAT 3, W9BQF 2, W9DGE 4, W9YC 53, W9EFK 1.

NORTHERN MINNESOTA — SCM, C. L. Jabs, W9BVH — The usual summer traffic slump seems to be here. Most stations report no traffic and inactivity. W9GGQ is starting a radio club at the Park Rapids High School with a membership of five. W9BHH works DX while not handling traffic. W9EHI complains about poor signals and fading on 7000 kc. W9CKI is on 14 mc. regularly. W9DPB kept a sked with PY1AW and will be on during the summer, with his newly built transmitter. W9ADS and W9CIY are rebuilding to crystal control and more power. W9CTW has a new receiver, but uses it very little. W9BVH is inactive due to lack of time. The outstanding event of the month was the banquet given by the Arrowhead Radio Amateurs at Duluth. The Twin City gang turned out in fine style and the banquet was a huge success. The Arrowhead Radio Amateurs are to be congratulated on the way they put it over. The talk by Prof. C. J. Cosandy kept all spellbound and was well worth the admission price alone. W9DOQ is now at his new location and wishes to thank W9CIY and W9ADS for erecting his antenna. W9BBL is using a new 852. W9CPD is a new station in St. Paul. W9FFD is trying to work DX on 14 mc., but has no luck.

Traffic: W9GGQ 27, W9BHH 23, W9EHI 20, W9CKI 13, W9BCT 7, W9BVH 6, W9CTW 4, W9DPB 1, W9DOQ 17.

NORTH DAKOTA — SCM, B. S. Warner, W9DYV — W9FCA's plate supply went south, so he thinks that he will QRT the ham game. Better try again, OM. W9BVF reports a very nice traffic total. W9DM has moved to a new location, but has not had time to install his zepp yet. W9DGS was visited by W9CPM and reports that he blew his plate transformer. W9CRL sends in a report for the first time and states that he will apply for an ORS ticket in the very near future. W9AAN is using 2 watt output from four 201A's in push-pull Hartley, Heising mod. When this report is in print, the new SCM will be in charge of this section, and I want to take this opportunity to thank all the ORS members in this section for the splendid coöperation which has been given me, and I hope you will continue to give the newly elected SCM the very best of support; as that is what makes a good section in any division.

Traffic: W9BVF 112, W9DGS 73, W9FCA 29, W9CRL 10, W9AAN 6.

SOUTH DAKOTA — SCM, Dwight M. Pasek, W9DGR — The reports dwindle with the coming of good weather. W9DNS and W9DB are the only stations to report. W9DB reports lots of DX on 14 mc. now and QRN on 3.5 mc. He is keeping South Dakota on the A-A map, however, maintaining skeds with W9DGR, W9CIR and W9DNS. W9DNS still runs his Minneapolis schedule regularly and has a nice traffic report. He also reports W9DIY and W9DQS busy building equipment. W9DNS is looking for a sked west! W9CIR in Mitchell is on 3.5 mc. every evening and is one of the regular A-A stations.

Traffic: W9DNS 165, W9DB 7, W9DGR 2.

DELTA DIVISION

ARKANSAS — SCM, Henry E. Velte, W5ABI — We have reports from several new stations which we are very glad to get. W5BMI, using one 201A tube with 180 volts on the plate, has worked 7 U. S. districts and VE3 and VE4. His portable call is W5BNQ. W5ACM expects to soon be on the four upper bands with both CW and 'phone. W5BDD and W5BLG are both proud fathers of new sons. Congratulations, OMs. W5IQ is back on the air after having to tear down and move. W5HN is increasing power and has been busy getting a new ham station on the air. FB, OM. W5LV is on 7 and 14 mc. He has been appointed our new Route Manager. If you want skeds, drop him a line and he will try and arrange them for you. Address is P. O. Box 672, Dermott, Ark. W5BDB has a new MOPA transmitter. He has skeds with W5ALY and W5AQY. W5AMM is a new station in Texarkana and expects to be on soon. Remember, gang, this report depends on you and the more reports, the bigger this repo t. So let 'em come.

Traffic: W5ABI 18, W5HN 12, W5LV 6, W5BDB 3.

LOUISIANA — SCM, Frank Watts, Jr., W5WF — The gang seems to have awakened to the fact that it takes a report to build up our section. The Monroe fellows have organized the Pelican Wireless Club and are going to have a FB organization. Good luck to you, boys. W5BHV is back with us after a trip to sea. No, he wasn't an op — he was cook. W5YW reports that the ops there are suffering from spring fever. W5ANA wishes skeds with New Orleans. W5BCM is now working on 14,000 kc. W5BJA ordered an 852 and it came with a bum plate. W5RR is pounding out with a 50-watter now. Watch him go. W5WF was off the air for a few days, as the rectifier went west. Now come on, fellows, with a larger report next month. This SCM report is just what you make it. I can't make a good report if I don't get a report from you.

Traffic: W5WF 92, W5YW 62, W5ANA 27, W5PG 8, W5BHV 7.

MISSISSIPPI — SCM, June W. Gullett, W5AKP — W5AZV reports that amateur radio is on the boom in Jackson, and he says that two of his code class now have licenses and their calls are W5BNW and W5BNX. W5AZV's code classes have presented him with a crystal, so it looks as though he will try a crystal-controlled transmitter soon. W5BME is the call of the amateur transmitter at WJDX. W5AAP operates on 7160 kc. and has a schedule with the SCM daily at 1:45 p.m. W5AWP is putting a new transmitter on the air in the 7000-kc. band May 1st. W5AJJ has just had his license renewed. W5AOM is now in the 14,000-kc. band and has worked 40 states, all VE's, X, YS, Canal Zone, OA, LU, 2 CT's and 2VK's and has hopes of working Asia and Africa with his 210. W5AKP is having trouble getting two "8" tubes that will work together.

Traffic: W5AKP 84, W5AZY 77, W5AAP 40, W5AWP 16.

TENNESSEE — SCM, James B. Witt, W4SP — I hope we can do as well during the summer months as we have

during the winter. Our state seems to be getting lined up pretty well, and let's keep it that way, fellows. W4KH has worked a lot of DX and has also sent 4 rectobulbs west. W4RP sent in the best report again this month and he was off the air ten days. FB, OM. W4AFS says one of his 50-watters went west. W4VK sends in a nice report and says he's going down on 20 for the summer. W4CW has moved and is putting in new push-pull xmitter using two 210's. Some stations that have been reporting failed to send in a report this time.

Traffic: W4RP 213, W4AFS 72, W4VK 51, W4FR 26, W4SP 13, W4AJQ 10, W4CW 5, W4ABR 3, W4KH 8.

HUDSON DIVISION

NORTHERN NEW JERSEY — SCM, A. G. Wester, W2WR — Traffic took another jump and your SCM hopes that it will continue over the summer months. Fine interest is being shown by non ORS. Their reports are always welcome. W2WR is closed down for a complete overhauling. W2JF makes the BPL. W2AOS is busy with Army skeds. W2APU bemoans the loss of another 210. W2ANH and W2AVQ are doing fine work on 14 mc. W2CWK is getting a Vibroplex for his Pyrex arm. W2BME is feeling with push-pull. W2UK, W2BJS and W2AIN are playing with 3500-kc. fone. W2JT is building a MOPA for 7 mc. W2BAU is doing fine DX work on 7 mc. The Raritan Valley Radio Club of New Brunswick is holding a banquet on June 14th. Anybody interested should write to W2BJS. W2JC has a strong drive on to keep amateurs within the bands. W2BDF just returned from Haiti as chief on the SS. *Padill*. W2CJX worked all continents on April 5th. W2BHW and W2CDQ are new in Ridgewood. W2BY is having fine results on 14 mc. W2BIR is still finding it hard to get time on the air. W2IS is back on the air. W2CO is installing a new MOPA. W2BZB has been experimenting with fone and xtals. W2BYT is working good DX on both 7 and 14 mc. W2CXL as usual leads the section in traffic. W2AUP passed the century mark in traffic. W2BPY is trying to get settled on some small gap in the 7-mc. band. W2DV has cured all his 14 mc. troubles. W2PC is in line for an ORS. W2AGB sends in his first report in years.

Traffic: W2WR 17, W2JF 134, W2ACS 46, W2CWK 31, W2JC 2, W2CJX 32, W2BIR 2, W2CXL 370, W2AUP 104, W2BPY 4, W2DV 25, W2PC 44, W2AGB 6.

NEW YORK CITY AND LONG ISLAND — Acting SCM, V. T. Kenney, W2BGO — Reports are much better, but traffic is still very light. Too bad we did not receive any report from our prize traffic station W2SC this month, but we assume that regular Army work is taking all the spare time that the ops have as they are short-handed. Manhattan: W2AFO leads his boro and is now using crystal control on 7030 kc. and keeping 15 skeds a week. W2BDJ, one of the boys who helps keep W2BWI, 27th Special Troops' station on the air, is doing better in traffic work lately. W2ABU is handling traffic in the form of rifle scores for the N. Y. Stock Exchange. W2BXW is working DX on 7095 kc. and is getting a radio club together in Yorkville; anyone interested will be supplied with full information by getting in touch with either him or W2ABU. W2AOY has an MOPA going and is still busy with studies at Columbia. W2JV, "Doc" Berg, is beginning to take an active part in traffic. W2BQK works exclusively on the 7-mc. bend, but cannot get much traffic. W2OV is trying 10 meters and is looking for skeds on that band. W2AVK goes on the inactive list due to business and studies. W2BZN, a new ham, is using a 510 in a TPTG. Bronx: This boro comes through with some good totals this month led by W2BPQ, our route manager. W2AII is working plenty of DX as well as handling traffic, although he recently blew out his 210. W2CYX keeps three skeds a week with England, France and Germany and Dolly, the YL op at that station, is working hard for a WAC. W2VG reports speedy work in getting a message to the coast via W9ACL and W6APA in 45 minutes. W2APV is ready for fone work on 20. W2AQG will be known also as W2CXW (portable); he says it will be impossible to reach his new antenna without a scaffold and a 40-foot extension ladder. W2AET has returned from Atlantic City where he reports having had a good time. Brooklyn: W2APK, a brand-new ORS, is leading; he QSP'd traffic from KH1DK (Blimp "Defender" to W1MK and QSO'd Spain). W2BO, that standard frequency station, is back in town again and hanging up a nice total. W2ARQ is keeping eight skeds a week and reports a new YL arrived at his home recently. W2PF, 2nd Corps Area Radio Aide, is handling plenty of Army traffic and keeping his Army skeds regularly. W2UD is back in Brooklyn after spending the winter in Chicago and St. Louis. W2BRB is helping W2CLA get a new high-powered CC job on the air. W2BIV will soon be using crystal control on all bands; he has just completed W2APQ, the station at Long Island University, and has it perking nicely. W2CCD can be heard on 20 with a d.c. note. W2ATZ has returned from the expedition to the caves of New Mexico, but expects to leave for Europe very soon. W2BEV, a new ORS, is on 20 now and stepping out some, too. Long Island: W2AVP, L. I. RM, leads that part of the section, as usual, and is having better luck getting traffic into New York City. W2BNX is working hard for an Asian QSO so he can get a WAC. W2AYM, the Boy Scout station, has been forced to cancel all skeds, but will resume that work in the near future.

Traffic: Manhattan: W2AFO 36, W2BDJ 22, W2JV 23, W2ABU 22, W2BXW 19, W2AOY 9, W2BQK 3, W2JV 2, W2AVK 1. Bronx: W2BPQ 104, W2BGO 58, W2AII 51, W2CYX 48, W2VG 30, W2APV 21, W2AQG 20, W2AET 14. Brooklyn: W2APK 143, W2BO 67, W2ARQ 61, W2PF 46, W2BIV 23, W2CCD 14, W2ATZ 10, W2BEV 5. Long Island: W2AVP 84, W2BNX 8, W2BFC 1.

EASTERN NEW YORK — SCM, H. J. Rosenthal, W2QU — Some very good traffic totals were handed in this month, and it is hoped that the good work will keep up. With one exception, the big reports are coming from the men handling foreign schedules, so here is an idea for anyone looking for messages to handle. W2QN now has a reliable sked with Rio working 'phone and CW with that point. W2FN has a daily schedule with the Virgin Islands and says his messages originate from the sailors on the U. S. fleet there on war maneuvers. W2QU is still keeping traffic moving between New Rochelle and Nicaragua. W2BC ran the transmitter at the Port Chester Radio Fair and built up a big total from that source. W2LU handled a large number of domestic messages, and reports that the Schenectady Amateur Radio Association now has a membership of 75. W2BUW is also handling Virgin Island traffic. W2BWV, a doctor, writes that he pushed traffic between operations at the hospital and is moving to the eighth district next month. W2ACB now has a crystal working in 20 meters. W2RD finally has his crystal 'phone set going on 80 meters and also has a CW set for 40. W2ALI says Hopewell Junction is so far away from anything there just isn't any news around his location. W2BJA suggests that someone resurrect an old spark transmitter and call the off-wave stations to let them know about their wrong frequency. W2ANV reports two new Army Amateur stations in the district, namely W2SJ and W8DSA. The AA work is progressing nicely in the district, and W2ANV turned in a very nice traffic total. W2ACY deserted 80 meters and is trying 20 and 40 for a change. W2AYK has been away on vacation. W2BKN reports great DX; he worked his own town the long way around the world. Hi. W2BAI blew his 852 winning the third prize in the message contest for the country. W2UO nearly had his license cancelled when some bootleg station worked off-wave using his call. About ten of the ORS have not been sending in their monthly reports and, unless explanations are received before next month, there are going to be a flock of cancellations soon. Many of the hams who belong to the Naval Amateur Reserve have spent two weeks on active duty and all report they enjoyed it immensely and learned a lot of Navy procedure during their stay at headquarters.

Traffic: W2BC 626, W2QU 592, W2FN 463, W2BUW 264, W2LU 233, W2QN 157, W2ANV 104, W2BWV 41, W2ALI 33, W2BJA 28, W2RD 25, W2ACB 15, W2AYK 3, W2BKN 3, W2UO 16.

MIDWEST DIVISION

IOWA — SCM, H. W. Kerr, W9DZW — Migration has been in progress for a week or more from here to other bands, to spring and summer labor, but look at the bunch of reports. Our RM tops the list and is in the BPL

as is W9BCA. W9FZO QSO'd a K6 on 7100 kc. W9DNZ has a d.c. note now. W9DPO is a new ham at Malvern. W9BCA says the Marines are leaving Nic. soon, so it will be GB to much traffic for him. Fine report, W9ACL. W9DXP tears down again to add another stage. W9FFD finds business improving. W9ELV is rebuilding and improving the power supply of W9TA, the Tri-State Portable. W9FWG has a nice report. W9FUD says there are two new hams in his town. Lost: two skeds, please return to W9EOP. W9DUU-W9BQZ sends in his first report. Another "gas alley" up at Perkins Corners; motorists, watch out for W9ALU there. W9GKF has our thanks for a report from Early. W9EFU worked K4DK. W9GKL still upholds Ames' reputation. W9CK is heard again with crystal. W9DPL now has two 210s. We want W9ALU to have credit for 21 messages on last month's report which did not reach us in time. W9FYC wants to know if it is out of the ordinary to hear G5YG at 5:30 a.m. C.S.T. on 14,000 kc. The Club at Iowa City has changed its name to the "University Amateur Radio Club" and has a station, W9IO, which was exhibited at the Mecca Week Exhibition. Under the leadership of W9AWA, the club sponsored a transmitter exhibition at the Iowa City Better Homes Show.

Traffic: W9EJQ 243, W9FZO 106, W9DNZ 89, W9BCA 83, W9ACL 81, W9DZW 73, W9DXP 69, W9FFD 64, W9ELV 48, W9FWG 39, W9FUD 32, W9EOP 24, W9DUU 15, W9ALU 10, W9GKF 10, W9EFU 7, W9GKL 5, W9DPL 2.

NEBRASKA — SCM, C. B. Diehl, W9BYG — W9QY is too busy with farm work at this time to radio much. W9EEW rings the bell this time and we are tickled to see it, too. W9DTH is also having a run of business and traffic suffers for it. W9DTH is "tinkering" with 14-mc. 'phone. W9DVR is busy with observing. W9EBF is still at it, tinkering with QRP. W9FAM blew a tire and had to slow down, using rectobulbs now. W9DI is back at it again and wants daytime skeds. W9DI is having exams and had to pass up his radio for a short time. W9BOQ is very busy on his farm now; says W9EAQ is a new station in Marquette. W9BLW is experimenting with 28 mc. He will be on 14 mc. soon. W9BBS is quite busy on his railroad now. W9BQR works on 14mc. when he has time to be on. W9CGE and W9DFF report again.

Traffic: W9EEW 24, W9DFR 3, W9DVR 5, W9EBF 13, W9EHW 14, W9BOQ 23, W9BBS 5, W9CGE 1, W9DFF 6.

KANSAS — SCM, J. H. Amis, W9CET — Traffic honors go to W9FLG, the RM. W9BEZ is working lots of DX from his new QRA. W9DFY wants the gang to listen for his YL op who is signing "Kate." W9BWV worked his first Aussie. YLs and the coming of spring are having their effect on W9BTG. W9CET has been experimenting with cyrstals. W9ADM reports for the first time. A new MOPA is under construction at W9CKV. W9SS says his rig went hay wire. The Topeka gang are busy with a new USNR unit. W9DEB is unit commander. W9FKD is going again at a new QRA in Emporia. W9EUX has been out of town all month. W9BHR seems to have spring fever. W9CV is going strong with 14,000-kc. fone. W9FXY is on week-ends. A new ham (ex-9DND) is reported at Valley Falls. W9ESL is trying different kinds of antennas. W9CFN reports by radio. The K.V.R.C. is planning the Division Convention for the first week in September.

Traffic: W9FLG 148, W9BEZ 43, W9DFY 40, W9BWV 39, W9CET 37, W9CFN 35, W9BTG 32, W9ADM 25, W9CKV 12, W9SS 8, W9FKD 6, W9FXY 5, W9GFM 4, W9ESL 4.

MISSOURI — SCM, L. B. Laizure, W9RR — W9FTA led in traffic in St. Louis and is a new OBS. W9ZK was next with W9PW third. W9BMU is trying to snag Asia for his WAC diploma. W9FUN has a new a.c. receiver. W9AMR got his 4th continent toward the WAC. W9DYJ is a new reporter. W9ZK-AAU reports 14-mc. fone going FB; W9DUD now has his commercial ticket. W9FTA wrote a book on his report card. W9BGN reports for St. Joseph. W9DKG is now on in Rolla with a 210. W9DUM is the only other station in Rolla. W9DKG wants all visitors to drop in on him. W9BJA cancelled all skeds after the new regulations for d.c. supply came out and went off the air for the time being. W9CJB has his Sweepstakes Certificate on display for all visitors. W9EPX joined the U.S.N.R. W9CDU and W9EFR are putting in xtal on 7 mc. W9FCB is a new Nevada station. W9DHN is rebuilding. W9ENF was busy on State Highway work. W9ASV draws congrats on his new commercial ticket. W9ECS has moved to Kansas City temporarily and is camping at W9DQN. W9AKZ led the traffic in K. C. W9GCL is another out-state station to remove to K. C. this month. W9BMA has some plans for new equipment by next fall. W9DPA is handling traffic regularly and reports W9CSK, another new K. C. station. W9GGI has been on occasionally. W9RR has been off since the first of the month due to job QRM and the new d. c. regulations. W9CFL has been putting in considerable time at the Naval Reserve Armory preparing quarters for the U.S.N.R. gang to hold their instruction classes.

Traffic: W9BMU 13, W9PW 49, W9AMR 12, W9DYJ 11, W9ZK-AAU 55, W9GHG 1, W9DUD 12, W9FTA 78, W9BGN 31, W9DKG 7, W9BJA 262, W9CJB 18, W9EPX 4, W9CDU 42, W9ENF 8, W9DQN 143, W9AKZ 142, W9GCL 21, W9BMA 44, W9DPA 71, W9RR 5, W9BJA (Feb-Mar.) 202.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, F. T. Ells, Jr., W1CTI — W1BHM keeps a daily schedule with FSKZ and has been QSO over 40 foreigners, including New Zealand. W1JN has time for only one schedule, which is with W1AFB. W1TD finds 3500 kc. somewhat freaky. Your sigs sound OK here, OM. W1HQ says most of his traffic was on 14 mc. W1BOD reports a good total and lots of DX. He QSO'd ZL3AS during an eclipse of the moon with an R7 report from ZL3AS. W1ABL says operating time has been cut down, but experimenting is going on quite actively. An xtal will be installed soon. W1UE and W1CTB changed their QRA's. W1AMQ is working lots of DX and gets xtal reports. W1BJK is back with us again and is on 3500 kc. a couple of nights a week. W1AFB sends in a nice total and promises a d.c. note at once. W1ATW reports a new ham, W1BNF in New Milford. Welcome, OM. W1ATG has been busy with the Naval Reserve station, W1CAL, at Bridgeport. W1RP has a new Chevvy sport coupe and the YLs keep him QRL. W1CJD is in Europe. W1AJB reports by radio. W1VB has a nice wallop with his push-pull xmitter. W1AMG has been busy looking for new quarters for the N. H. Radio Club. W1AFG, a new station in Goodyear, sends in a fine total for a starter and says he will make the BPL next time. FB. A new station in Greenwich, W1AVB, was worked by W1CTI. Welcome, OM. W1ADW won first prize in the Sweepstakes Contest. W1BWM is having trouble with bad power leaks, which accounts for his low total. W1ZL reports working G6LL during the R.S.G.B. 28-mc. tests. Several of the old standbys were logged on 3500 kc. last CT nite. This is an excellent time to QSO the SCM and report your traffic totals by radio. Fifteenth of every month on 3500 kc. after 7:00 p.m. Let's go, gang!

Traffic: W1BHM 28, W1JN 22, W1TD 5, W1HQ 11, W1BOD 65, W1ABL 59, W1AMQ 25, W1BJK 6, W1AFB 66, W1ATW 33, W1BWM 1, W1RP 15, W1AJB 11, W1VB 15, W1AMG 14, W1AFG 38, W1CTI 34, W1MK 820.

MAINE — SCM, G. C. Brown, W1AQL — Everybody reports a big slump in traffic this month due to a bad spell of radio weather and various other reasons. It seems to be up to the gang to originate some worthwhile traffic and get some reliable schedules and then settle down with purpose of reviving the QSP idea. Please send in a report each month whether you handle any traffic or not. The two clubs of Portland and Bangor are doing fine business in the way of new members, also the Elm City boys report fine progress on the Convention this summer. We have a few new calls again this month. — W1BE, the new headquarters for the Augusta gang, W1AID "Dick" Green, Bangor; W1AIK, "Chet" Kennedy, Bangor; and W1JB, the headquarters station of the Fleet Reserve and Communication Reserve of Portland. A word might be added about those who are operating transmitters without the proper licenses. This is dangerous business. It is better to send in and get a temporary permit and be on the safe side. Lt. Comdr. F. J. Bailey, C-F, U.S.N.R., of Boston, recently visited Maine and assisted by Section Commander Fred Best held enlistment parties at Augusta and Bangor. A goodly number of men passed the physical examination and were made mem-

bers of the U.S.N.R. W1ANH seems to be high man this month. FB. W1AFA says he is on with a new 852 now. W1CDX reports that he has a portable station in Portland. W1QH reports bad weather conditions this month. W1FQ was a recent visitor in Boston, his trip being associated with Reserve Signal Corps in which he holds the Commission of First Lieutenant. W1BFZ reports bad power leaks in his section. W1AHY reports that he is unable to make schedules with any of the Maine gang. W1AUR says that he is more or less busy with the U.S.N.R.

Traffic: W1ANH 51, W1BE 47, W1AFA 42, W1CDX 31, W1QH 28, W1FQ 22, W1KQ 19, W1BFZ 17, W1AQL 17, W1AUR 6, W1BE 25.

EASTERN MASSACHUSETTS — SCM, M. W. Weeks, W1WV — In spite of approaching summer weather and less favorable conditions, section traffic shows no let up. W1CMZ, after two months' absence from these columns, turns in more evidence of his activity with a large total. Five stations make the BPL, W1CMZ, W1TL, W1RV, W1BXB and W1BKR. W1TL expects soon to leave for Newfoundland where he hopes to be heard from VO8AE. W1RV spent a few days in the hospital for spring overhauling preparatory to a commercial job. Navy drill traffic helped W1BKR to run up a good total, aided by his OW, W1DS. W1ASI is QRL hunting for a new job. W1QZ is still experimenting with push-pull circuits. W1WV took a six day auto trip visiting stations in Worcester, Springfield, Danbury, Hartford, New Haven and around New York City. W1WU is building an MOPA in his spare time, but is working 14 hours a day in his bakery, so progress is slow. W1LQ expects soon to be back on 3500, but has been DXing on 14,000. W1CMZ is on 3500 at night and on 7000 during the day and is also working fone. W1AAT is in the U.S.N.R. and unit commander for Salem. W1ACH is still plugging along on 3500 keeping the usual skeds, including one with W1MK. W1ACA still finds a little DX on 14 mc. W1KY has found little time for radio lately on account of business and sickness in the family. W1AGS got smashed up in an auto accident and has been in the hospital, so is off the air temporarily. W1BZQ is on 7000 during early morning hours, but expects a change soon. W1CCP, W1CHR and W1CQN are three new stations who begin reporting traffic almost as soon as they got on the air. We hope there will be more like these. W1AHV is back on the air with a new call, W1ZO. W1KH is using the new DeForest 510's and reports greater output and steadier signals. W1ANK reports again this month and is looking for an ORS. All are reminded that the new amateur regulations call for d.c. notes, and it is hoped that from now on the RAC note will vanish with a minimum of grief in regulation enforcement. W1BXB has been on a 10-day trip on a new cruiser.

Traffic: W1CMZ 413, W1TL 212, W1RV 153, W1WV 150, W1BKR 123, W1ACH 95, W1LM 79, W1BZQ 52, W1ACA 44, W1ASI 37, W1AAT 27, W1AZE 26, W1WU 25, W1ANK 24, W1KH 21, W1QZ 16, W1LQ 15, W1CQN 9, W1CCP 5, W1CHR 4, W1KY 2, W1BLD 2, W1BXB 202.

NEW HAMPSHIRE — SCM, V. W. Hodge, W1ATJ — Most of the active stations reported this month, which was very FB, gang. The fellows at Dartmouth, W1AOC, W1WH and W1BMS pounded out a bunch of traffic, using the call W1ET. A new ¼ kw. xtal rig is planned. Doc Steady, W1BST, gets a little time at the key between osteopathic victims! The new crystal rig at Phillips-Exeter will be going soon. 14 mc. is claiming W1IP's spare time. Outside work is also claiming W1AEF, but he expects to be back on 3940 soon. Our new ORS, W1CNR, is building a new Zepp. W1CDT will be on 14 mc. with an 852 soon. W1AUY keeps a bunch of skeds and has organized a fone relay chain with W1BMB. Watch for W1CCM, Concord, who is just starting. W1APK is keeping fone skeds and handling traffic. W1BFT is experimenting on 20 mc. with various antennas and reports very fine DX. W1UN sold his receiver to W1AJF and is building a new one. W1MB has moved to Charlestown and is off the air for a while. W1BAC is a new ham in Claremont. Ex-W1CAZ of the same town is cruising the briny as ship op.

Traffic: W1EH 70, W1IP 21, W1COW 20, W1BFT 14, W1APK 14, W1AUY 14, W1AOC 13, W1CDT 6, W1ATJ 4, W1CNR 21, W1AEF 1.

VERMONT — SCM, Clayton Paulette, W1IT — W1AOO has blown his filter condensers. W1BD says his High C frequency meter holds its calibration fine. A new receiver is in order next. W1CGX makes the BPL again this month. FB OM. He reports two new stations — W1BAS, who is old W1BCK located at the Armory at Brattleboro, Vt., and the other is W1ATF, Harry Page of Hinesburg, Vt.

Traffic: W1IT 5, W1AOO 10, W1BD 35, W1CGX 200.

RHODE ISLAND — SCM, C. N. Kraus, W1BCR — W1BCR is on 14 mc. with c.w. W1MO was recently QSO with G2KF. W1BML has just returned from Prince Edward Islands. W1AWE reported direct to HQs. The Radio Club of Rhode Island plans to hold its annual banquet soon. All amateurs are invited. The S.C.M. would like to hear from some of the O.R.S. in Newport, Woonsocket and Providence. We are looking for a good O.R.S. in Westerly. How about it?

Traffic: W1BCR 20, W1MO 14, W1AWE 3.

WESTERN MASSACHUSETTS — SCM, Dr. J. A. Tessmer, W1UM — W1AZD has a new junior op. The YL of the Berkshire Brass Pounders, W1AJJ, and W1AZW will be married next month. W1AMZ was home from college for a week and handled some traffic. W1ZA is busy keeping six skeds. W1BNL is lamenting the loss of a 203A. W1DR is keeping traffic moving over Westfield way. W1JV has deserted 14 mc. on Sundays for the golf links. Leo has been teaching the old Scotch game to W1ACV, W1ACW and W1ADO. W1AQM also does considerable DX on the links. W1ASU has recently been appointed an Ensign in the U.S.N.R. W1ZB has a 14-mc. phone rig perking FB. W1ADO is busy rebuilding. W1BKM-W1BEG is bothered with line voltage fluctuations and says he doesn't appreciate the power company's efforts to list his call in Prehistoric Signals. Hi. W1BVR has been elected president of the Springfield Radio Association. The Worcester Radio Association won a Crosley 8-tube BCL receiver at the A.R.R.L. Convention. W1BKF has deserted the prehistoric signals ranks at last. Judging from the prizes that W1BMM won at the Convention, Smitty ought to have quite a broadcasting station on the air. W1NS and W1BZJ have formed the 1-K Radio Engineering Laboratories. The A.R.R.L. Convention at Worcester was a 100% success and was thoroughly enjoyed by all who attended. The Worcester Radio Association wishes to take this opportunity to thank the many amateurs for their patronage and to thank the manufacturers who so generously donated over $1500 worth of prizes.

Traffic: W1AZD 261, W1AMZ 10, W1BKM-W1BEG 12, W1BVR 33, W1BZJ 24, W1ZA 107, W1BNL 1, W1DR 18.

NORTHWESTERN DIVISION

MONTANA — SCM, O. W. Viers, W7AAT — W7AAW leads the section this month. W7DD is still going on 3500-kc. 'phone and wants to know who has heard him. W7AKO, W7AEM, W7MI and W7JC are new Billings stations. W7MI operates the B.C. station, KGHL, there. W7AKO is a Morse operator. W7AAT has three transmitters on now.

Traffic: W7AAW 65, W7AAT 40, W7DD 20.

OREGON — SCM, W. S. Claypool, W7UN — W7AAR of Eugene is high man in traffic and is acting as State Net Control in the Army Amateur Net. W7ALM reports poor weather conditions. W7AHJ, the OW oprr., has a nice report. Much hamfesting is going on in the Coos Bay cities. W7AMF has a fine report. W7PE reports poor daytime reception. W7QY reports good conditions on 14 mc. W7WL has a sked with W6CGJ which netted him a few. W7EC is increasing power to one 210. W7AJW has been rather dormant since the Sweepstakes Contest. That certificate looks nice on the Club shack wall. W7WR and W7EO report.

Traffic: W7AAR 101, W7ALM 98, W7AHJ 41, W7AJX 6, W7AMF 28, W7PE 17, W7QY 15, W7WL 12, W7EO 5, W7EC 2, W7AJW 1, W7AOF 70, W7TO 7.

WASHINGTON — SCM, Eugene A. Piety, W7ACS — W7OJ says that he is regusted with radio. W7TK is the busiest of the fellows in Everett with W7ACY close behind him. W7NR is too busy to be on the air much. Farming work keeps W7AFD from doing anything spectacular. The Alaskans are back now and W7TX expects to start his

old skeds again. Three fellows report for the first time this month. They are W7AJS from Centralia, W7FK from Kirkland, and W7AFX from Snohomish. Fine work, fellows. W7IG is busy with his chickens and farm work. In sending in the news from Yakima, W7ANP states that they have about ten prospective hams there and fourteen of their club are going to join the A.R.R.L. W7OV sends in a very newsy report. W7AAE is back again and is looking for all of his old friends. W7KT is busy working at KMO. The Radio Club of Tacoma, now in their new club house, will be on with W7DK soon. W7AFO is back in town working for the telephone company. Don't forget your reports next month, OMs.

Traffic: W7OJ 47, W7TK 24, W7ACY 22, W7OV 14, W7AAE 14, W7AFD 11, W7AFX 11, W7FJ 9, W7AJS 8, W7ANP 8, W7TX 7, W7NR 6, W7IG 2.

PACIFIC DIVISION

LOS ANGELES — Acting SCM, C. A. Nichols, W6ASM — The following make the BPL this month and should be given a rousing cheer: W6DEP, W6WA, W6AKW, W6AKD, W6QP, W6BZY, W6AOA, W6FE. W6DEP, a new ORS, leads the section in traffic, and in his spare moments he is a jeweler. FB. The A.R.R.C. visited the Southern California Telephone Co. and was shown through the Telephotograph Department. A demonstration was given and then the gang were taken through the Exchange and a talk on the operation and care of telephones was given. Some of the A.R.R.C. gang journeyed to Bakersfield Sunday, April 13th, and were the guests of the U.S.N.R. Radio Club of Bakersfield. Speaking for all of them, I can say that we never had a better time in our lives. They have one of the peppiest clubs in Southern California. The Pasadena Short Wave Club continues to hold meetings at members' homes, and have been having some interesting talks on xtals by W6KA. The Long Beach gang has not sent the SCM any news, but we think they are still meeting in the City Hall over the jail. The Tri-Country Club is sponsoring the quarterly banquet in June. W6ELZ is going xtal. W6DZI is repairing Fords. W6ID has been busy with work. W6CHA is working at KMIC now. W6BFI wants to know why hams stay up all night. W6EQF, the SCM, is in Guadalajara, Mexico, and continues to get his signals into L. A. O. K. W6FE and W6BRO are his two main contact stations in L. A. If IPH doesn't answer you, fellows, you can rest assured that he is too busy with business. W6ZZA is not traveling much now. W6AZL is building a new receiver. W6ERL was QSO SSIXE, who was 125 miles off Siam. W6BVZ reports death of his Kress 250. Hi. W6WO is putting up a new Zepp. W6ABK is now using xtal control. W6AM reports receiving a Sweepstakes Contest certificate. W6BUX has moved into the East Bay section and taken his extra first ham ticket with him. Good luck, OM. W6BVT reports the new crystal much better than the old one. W6CUH made the WAC in 13 hours and reports DX good. FB. W6AWY reports working South Americans and chewing rag in Spanish. W6FJ won traffic contest between his heap and W6ASM's nice set. W6DOZ, a new ORS, was heard in Germany. FB. W6BGF shot his 210's, but continues to QSO DX. W6ETJ is the new chief Route Manager. W6OF has a new screen-grid receiver. W6EA was heard in Asia. W6EQD has a rebuilt W6EX fifty. W6TE has been bothered with college exams. W6EAF reports that replacements at his station have cost $1.32 for the last two years. Scotch? W6DVA is going strong. W6DYJ likes current fed antennas. W6ESA has trouble with power leaks. W6FE has a daily sked with IPH. W6BZY says that his bug went haywire and so the traffic went down. W6QP says all skeds are working fine and his total will be higher next month. W6AKW says the Army net is going good and wants more L. A. stations in it. W6WA is the new Route Manager for Bakersfield and is also president of the club there. W6BCK and W6CGY have ideas that they might own an xtal some day. W6LN is taking care of the Long Beach end of a chess game between Argentina and Long Beach. This is being handled on 20 meters and the Argentina station is LU3FA. FB. W6BRO is taking some of the press from IPH and reports receiving a 900-word message. W6ASM has been very busy with work but had time to go up to Bakersfield to the hamfest there. W6UJ is using a portable to keep skeds with while rebuilding his other transmitter into crystal control. Fellows, let's keep up the good work and handle a little more traffic. We could also use some more ORS. W6BXR took the fifth step and was married, April 5th. Good luck, OM.

Traffic: W6DEP 401, W6WA 346, W6AKW 330, W6AKD 301, W6QP 203, W6BZY 202, W6AOA 154, W6DLI 141, W6ETJ 136, W6AOB 119, W6LN 91, W6DQV 90, W6FE 89, W6ESA 88, W6UJ 84, W6DYJ 72, W6ZBJ 62, W6BCK 60, W6DVA 56, W6BZR 46, W6EAF 45, W6ENH 40, W6CGY 40, W6EKE 28, W6DYK 27, W6ETN 25, W6EQD 24, W6EA 18, W6CXW 13, W6OF 20, W6CUK 19, W6BGF 18, W6DOZ 17, W6FJ 14, W6AWY 14, W6ABI 13, W6ENQ 10, W6CUH 9, W6BVT 9, W6CIX 9, W6BUX 8, W6BRO 8, W6AM 6, W6WO 5, W6ABK 6, W6MA 4, W6BVZ 4, W6ACL 6, W6COT 3, W6ERL 2, W6AZL 1, W6ASM 1, W6CZT 12.

SANTA CLARA VALLEY — SCM, F. J. Quement, W6NX — W6HM continues to be the main outlet for Trans-Pacific traffic. Quote from W6HM's report: "These 382 messages all trans-pacific. The originated are messages that came to me by mail, airmail or telegraph. The delivered were all messages received from abroad, of course, mostly P. I. and China." It is doubted whether there is another amateur in the U. S. A. handling such a volume of important traffic. W6ALW made the BPL this month, maintaining a daily sked with W6UJ. W6YG has been consistently handling traffic, skeds with W6ALX, W6DVD and W6DUI are responsible. W6DQH, the RM, is handling many Army messages. W6JU complains of bad weather on all bands. W6BLT has a daily sked with W6BNH. W6BMW has been developing portable phone sets for State Fire Wardens. W6BAX QSO'd five Aussies and 2 Zedders on 28 mc. with reports of being received in England and China. FB. There is a rumor that the wedding bells will soon ring for W6BNH. Hi. W6BYH is now an OBS. W6DCP has a S/W receiver now, and W6EEC is a new ORS. W6AME reports bad weather and that "SL" is back as OP again. W6NX is putting in xtal control for all bands except 5 meters. Stations desiring skeds should get in touch with RM W6DQH.

Traffic: W6HM 382, W6ALW 216, W6YG 136, W6DQH 55, W6JU 36, W6BLT 28, W6BMW 26, W6BAX 18, W6AME 7, W6EEC 5, W6BYH 3, W6BNH 1, W6NX 8.

HAWAII — Acting SCM, L. A. Walworth, K6CIB — K6EWB made the BPL in January but was not reported with his 208 total. He came forth with 271 this month for BPL again. K6CIB should have been listed in the BPL for his work during the month of December when he handled 223. Hawaii is so far from Hartford that divisional reports are old by the time *QST* brings them back so a local sheet "Hamaloha" is being tried as an experiment for three months. McKinley High School, former K6EAT, is on the air but is K6YAL now. K6EWB is by far the most active station this month and is applying for ORS, Official Observer, Route Manager appointments. K6DV and K6AVL are not far behind. Many of the civilian hams have suddenly revived and are asking for ORS.

Traffic: K6EWB 271, K6ALM 99, K6CIB 42, K6AVL 38, K6KB 32, K6ERO 9, K6ERH 7, K6CB 6, K6ACW 2, K6EVW 40.

EAST BAY — SCM, J. Walter Frates, W6CZR — W6EIB, the old reliable, is still in lead position for the section in traffic with a fine total secured from skeds with KAC1M, VE5GT, K6DQQ and W6ASH. These skeds give a fine idea of the range and reliability of his very FB station. At the present time he is arranging a transmitter and booth during the meeting of the Redmen in Vallejo which should bring in a fine total for next month. He will be glad to handle any traffic for P. I., the Hawaiians, and Pacific Coast points. W6ASH is the second highest man in traffic, all secured with some early morning skeds with Pacific Coast sixes. W6ALX's totals have begun to creep up again to the point they were when he won one of the individual cups in the L. A.-East Bay competition last year. In addition he is turning out commercial operators for the trans-Pacific vessels as fast as he can. Due to the immense amount of work on hand at the Marine Barracks at Mare Island, Babcock of W6AMW reports that he did not have the time to spend on radio last month. W6EDO is back in

Pope Valley but is QRW work. W6EDK recently received his Signal Corps flag from the War Department for his work with the First Pursuit Group flight last winter. W6BIW reports that he has been trying 14 mc. with some success, but the band is erratic. W6CGM reports getting a card from Germany and says he has been QSO with VK, KA and K6 stations with his low powered transmitter. W6BBM has never reported before, but his totals are very welcome and will be expected each month. W6RJ says he has been QSA4 in New Zealand on 3500, but that he has been devoting considerable of his time to OO work. W6BZU is pounding away at Concord, but is being kept busy by other radio work. W6BNG hands in a good total, considering the fact that he has not been reporting very long. W6AUT reports that W6BYS has returned from a Naval Reserve cruise and is on again with his 250-watter; that W6CZN has his screen-grid receiver working FB and that he, W6AUT, is using a push pull TPTG with a UX210 on 7000 kc. W6BMS announces that he is rebuilding again, and is using his monitor for a receiver temporarily. W6AIN comes in with another total, and declares that three members of the Piedmont Radio Club of the Piedmont High School are trying to learn the Morse Code. W6EBM handled only two messages and is proud of it, which he should be, considering the QRM in his neighborhood. W6EY is still rapping out on the 7000-kc. band. W6EDR says he is going to 3500 soon and wants a sked with S.F. W6ALV announces he will be off the air for some months. Boating has taken the place of hamming —but the boating isn't solo. W6BI announces that the Naval Reserve district has been allowed six CW 938 radio telephone sets and they will be operated on 1715 to 2000-kc. band with code instruction and voice instruction to go with code work. They will also be used for ham work and he will give the entire sked soon. W6BSB is in New York, going as operator with Dr. Dumbrava on the Roumanian Arctic Expedition and will work near the 14-mc. band from East Greenland after August 15. W6CZR-W6GB will go to 14 mc. in an effort to click with Bisbie and the expedition. Jim Warner of KHAB, the Southern Cross, recently gave an intimate talk on the flight to the Oakland Radio Club somewhat on the lines of the recent article in *Liberty Magazine*. E. M. Sargent demonstrated his eleven tube shield grid superhet short wave receiver with its static eliminator at the last meeting of the East Bay Section. W6ASJ has been doing yeoman work with his observers on 7 and 14 mc. and reports that off-wave operation seems to be clearing up. W6CTX announces he is selling out. He is one of the pioneer hams of the section. W6AQ is arranging a set of booths and stunts to get traffic for the section, and W6AN is about ready to open up on 3500. W6AWF and W6DWI announce considerable success on 30 mc.

Traffic: W6EIB 396, W6ASH 225, W6ALX 165, W6AMW 91, W6EDO 56, W6EDK 48, W6BIW 24, W6CGM 28, W6BBM 26, W6RJ 26, W6BZU 14, W6BNG 11, W6AUT 11, W6BMS 11, W6AIN 10, W6ATR 9, W6EBM 6, W6EY 6, W6ATT 5, W6BYS 2, W6EDR 2.

SAN FRANCISCO — SCM, C. Bane, W6WB — The section will be pleased to know that for March we grabbed the traffic honors for the division, thereby winning the much desired banner for that month. The men reporting are to be thanked for their bit in making this possible in such a small section. Particular credit is due, of course, to our star traffic man W6AD and his second operator, who contributed greatly to our success. Our RM, W6ERK, has been moving mountains to stimulate interest in traffic besides being a regular and heavy contributor to the monthly totals. W6PW rejoins our ranks this month with a bang, having done some nice traffic handling. W6DFR moved his A-A traffic up several notches and passes the hundred mark for the first time. W6DBD ran out on us and is now up in Alaska at a cannery station pounding brass. W6BIP has gone DX crazy and is heard nightly haunting the 14-mc. band. W6CIS reports, but informs us that he is leaving the section for about three months while he relieves some of the gang at the Department of Agriculture stations. W6EKC has proven himself and won his spurs as ORS. W6ETR reports and says that he is rebuilding to use more power. W6DPF is evidently back to stay, as this is his second consecutive report. W6EPT again joins the ranks after a long absence. Glad you're back, OB. W6ERS is beginning to spurt right up in the traffic besides working plenty of DX. W6WI sends in his first report. FB. W6AMP is finally all set up again and is going strong on DX, but light on traffic. W6PQ reports and is still nursing that fifty along on 300 volts. Hi. W6AMZ says he is struggling with the set but chiseled in some traffic. W6KJ reports working two nines on 28 mc. using an 852 in self-excited circuit. W6BTO also works some stations on 28 mc. on week-ends, but is doing FB DX on 14 mc. W6WN says traffic is nil as no transmitter as yet. W6ATI continues to pound nails in the day and brass at night. W6WB copped off the honors for the section in the January Sweepstakes and also hooked his extra first ham ticket for 14-mc. 'phone. W6FK sneaks off on the week-ends and haunts W6BAX's country in hopes of improving his DX. The S.F.R.C., after much debate, has decided to affiliate with the A.R.A. The organization resulting from such a move cannot help being the greatest S. F. has ever known and is conducive to better understanding and co-operation within our section. The name will be the Associated Radio Amateurs of San Francisco and we all look forward to bigger and better meetings. The meeting place will remain at California Hall, Polk and Turk Sts., San Francisco.

Traffic: W6AD 1106, W6ERK 585, W6PW 112, W6DFR 102, W6BIP 80, W6CIS 45, W8EKC 43, W6DPF 25, W6ETR 19, W6EPT 17, W6ERS 17, W6KJ 6, W6WI 6, W6PQ 5, W6AMZ 4, W6AMP 3, W6BTO 2, W6ATI 1.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — All stations but two reported this month. W6ACJ as usual leads in traffic. W6BKX is now an ORS and is second in traffic. W6EPF has got going again with xtal PDC. W6BGL is trying fone on 3.5 mc. W6EPZ won the Sweepstakes Contest in the San Diego Section. W6EOP is building a portable for summer vacation. W6ADC is another new ORS. W6CTP with a 171 works IPH and WFBX with R6 reports. W6BAM worked VK5HG on 28 mc. W6EOS is building a 100-watt xtal xmitter and will be on again soon. W6CNK has trouble keeping his battery up on his dynamotor. W6BAS is building xtal 'phone for 14,000 kc. W6BFE is going in for Navy amateur work. W6EOM is now W6ECP, as he lost his old call. W6CTR has a new QRA. W6DGW is building a new MOPA. W6AEP of Oceanside is now an ORS. Several of the P.A.T. Club visited W6FP the other night and were served with some good eats. All had a fine time.

Traffic: W6ACJ 150, W6BKX 90, W6EPF 38, W6BGL 21, W6EPZ 16, W6EOP 15, W6ADC 11, W6CTP 9, W6BAM 8, W6EOS 4, W6CNK 1.

ARIZONA — SCM, H. R. Shortman, W6BWS — W6EFC reports a new ham in Phoenix signing W6DXC. W6EAA is going to wind a new plate transformer and get back on the air. W6CDU reports the National Guard station on the air. W6BWS says, "Look for me with my new call, W6VV, and the new crystal set." W6AWD reports two new hams in Mesa. W6DGN is getting out fine on 14 mc. W6BJF has at last hooked a Jap. W6DCQ has a new fone set that blankets the whole 3500-kc. band. Hi. W6EOF has a new transmitter.

PHILIPPINES — SCM, S. M. Mathes, KA1CY — This report received by radio via W6HM — KA1AC is now operating at KA1JR for the summer. KA1AF is closed for three months. KA1AW is visiting Shanghai hams. KA1CE sends in a nice report. KA1CM is breaking in a bunch of new ops. KA1CY is closing down for an extended trip to the States. KA1DJ is our cracky, traffic station this month and has applied for an ORS appointment. KA1DL has a 250 bottle on the air. KA1EL has gone to Baguio with a portable transmitter for the summer. KA1HC skeds with W7MO and AC8HM. KA1HR has had hard luck and xmitter troubles, but turns in a good traffic report. KA1JR takes over the administrative duties as Asst. SCM. Get behind him, gang, and make the Philippines the biggest and best section in the League. KA1MN is on with a 50 in a TPTG. KA1OM needs a key. KA1PW reports a fine trip south. KA1RC is breaking in new ops. KA1XA works sked daily with KA8AA who is isolated on a cattle ranch and cocoanut plantation on one of the southern islands. KA1ZA drowns out the band with 500 cycle AC. KA4HW is heard with 15 watts working U. S. A. KA7AD got all set, sent CQ, burned out MG, got disgusted and quit. Then he received a card from a ham in Calif. who had heard his CQ and is now hus-

tling up a new power supply to get on again. KA7PA was heard working KA1EL. KA1AU keeps a sked with KA1XA. KA9PB keeps the ham fires burning in Zamboanga.

Traffic: KA1AF 129, KA1CE 109, KA1CY 95, KA1CM 390, KA1DJ 697, KA1HC 42, KA1HR 600, KA1JR 110, KA1RC 54, KA1PW 151.

CHINA — This report sent in by radio from AC8HM via W6UC. Shanghai hams were visited by AC3FR, VS6AB of Hongkong and KA1PW of Manila during the past month. AC2CB, Peiping, AC2MK, Tientsin, AC3ER, Chefoo, and AC8WE, Shanghai are new hams. The following stations are now off the air: AC2AL, AC2FF and AC1TS. AC8HM makes the BPL. AC9GH handles a nice bunch of traffic.

Traffic: AC8HM 188, AC9GH 114, AC8AY 69, AC8TJ 54, AC8MA 47.

ROANOKE DIVISION

NORTH CAROLINA — SCM, Hal S. Justice, W4TS — Things have been very quiet in the Section and traffic handling is on the decrease. All active stations are requested to send in reports and bits of gossip to liven things up. W4ABV, our leader in traffic for several months, must discontinue operation for a few months. Here's hoping you are with us again soon, OM. WNRC sends the Official Broadcast daily on 1440 kc., both fone and ICW. Following the OBS, code practice is sent at 5, 10 and 20 words per minute. W4AHH will soon have 250 watts c.c. on 3.5 mc. and is arranging some good skeds. W4AEW says traffic is on the bum, and is trying to arrange an entirely new set of skeds. W4RX has two UX852 in push-pull c.c., and is building an a.c. screen-grid superhet. W4JR is finding more time to be on the air, and finds plenty of traffic on 3.5 mc. W4TS is disposing of most of his apparatus. W4AA organized the Greensboro Radio Amateur Club. W4ZB is rebuilding to use a 50-watter.

Traffic: W4JR 60, W4ZB 58, W4ABV 49, W4AA 37, W4AEW 23, W4DW 17, W4TS 16, W4RX 16, W4AHH 7.

VIRGINIA — Acting SCM, T. P. Mathewson, W3FJ — W3BZ now has crystal control. W3CA is using an MOPA. W3CKL is busy trying to finish college. W3ARU won the Va. certificate in the January Sweepstakes Contest. W3NO is the Va. Control station for the A-A net. W3BDZ is going to try his phone with a Zepp antenna. W3KR now has a bug. W3WO is doing excellent work with his many schedules. W3AQK worked VK3ES with his 210. W3AMB at last has a d.c. note. W3FE had coal wagon QRM. Hi. W3ABC aspires to be an ORS. W3ZU is a new ham in Richmond. W3FJ visited W2KU in New York. Ham radio is very active in Richmond due to the Short Wave Club. It now has fifty members. At a recent meeting, W4VB won a tube for being the DX visitor. W3ASA won a 50-watter donated by WRVA. Hammond of W3CEL offered his 75-watt transmitter for use in the club room.

Traffic: W3KR 120, W3WO 88, W3ARU 16, W3ABC 3, W3AQK 1, W3HO 5, W3AMB 4, W3FJ 20.

WEST VIRGINIA — SCM, D. B. Morris, W8JM — W8DPO sends in a nice list of off-wave stations, and the fine thing is that no W. Va. hams are in that report. W8HD keeps skeds with W8OK, W8DNX and had as visitors W8IB and W8DNX. W8CBV gets good DX and reliable traffic on 14,000 kc. W8ACZ passed the amateur first while attending the convention at Charlotte, N. C. W8TI keeps reliable skeds with W8HH, W3ADO, W9FIG and W8DEN, also worked west coast 12 times last month. W8JM is trying to put a station on in the Sigma Tau frat house, at Fairmont State College. W3UO keeps improving WMMN. W8BCN said he didn't think much of all the new rules being passed. Hi. C'mon, gang, where's that traffic? Skeds and traffic is what counts. Also, please check your wave, each time before you go on the air.

Traffic: W8ACZ 67, W8JM 55, W8TI 31, W8DPO 28, W8HD 19, W8CBV 13, W8BCN 11, W8AYI 6, W3UO 4.

ROCKY MOUNTAIN DIVISION

UTAH-WYOMING — Acting SCM, L. D. Stearns, W6BTX — In spite of coming summer, activity is increasing. W7HX has been appointed Official Observer — keep your eyes on the frequency meter. W7AAF in Jackson Hole reports a coming station. W6DPJ leads in traffic, and won a certificate in the January Sweepstakes Contest. The Utah Amateur Radio Club shows new stimulus with proposed station. W6BVB built the YL a set. Now she teaches in Idaho and they click every night on sked.

Traffic: W6DPJ 57, W6BTX 35, W6EKF 12, W6DPO 4, W7AAF 4.

COLORADO — SCM, C. R. Stedman, W9CAA — W9CVE leads in traffic. W9EJW did fine work. W9EAM is on 7000 and 3500 kc. W9CSR is experimenting on 28 mc. W9CAA has dismantled.

Traffic: W9CVE 70, W9EJW 51, W9EAM 21, W9CDE 3, W9CSR 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Robert Troy, Jr., W4AHP — W4LM leads the State in traffic. FB, OB. W4AJR is not on much. The gang's prayers are asked that W4PAI will work Asia and Africa. Hi. W4TI is running his part of the State A-A system very well. W4AG is working DX. Good luck. W4AHP has been busy refinishing furniture for the O.W. We are sorry to lose W4AHR as an ORS. He let his A.R.R.L. membership lapse. Hi. W4AEZ is having a hard time with his fone. He and W4AP keep a sked every day on 85 meters. W4CB has worked eight countries, including VK and ZL, using a 245. W1IA is off till school is out. He and W4OH are building a crystal-control fone. Very FB. W4DS is joining the A-A net. Welcome, OM. W4AKB is busy answering calls for the Ala. Power Co. — at the telephone switchboard. Hi. His other 50-watter broke, but he has another one. What has happened to you fellows in South Alabama? Not even a CQ out of you.

Traffic: W4LM 99, W4AAQ 75, W4AHR 47, W4PAI 17, W4TI 15, W4AHP 17, W4AJR 9, W4JX 29, W4AKB 1, W4CB 1.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES — SCM, M. S. Alexander, W4RZ — W4AFQ and W4DV did some fine work at the Southeastern Open Golf Tournament in Augusta, Ga. They set up stations at the club house and at the ninth hole and as the players passed the ninth hole, the scores were sent via radiophone to the club house where they were turned over to the reporters and score keepers. The officials and newspaper men were very much pleased with the novel way of keeping in touch with the players on the course, and expressed a wish for such services at the National Open Golf Tournament. That certainly is FB and shows the amateur spirit. W4SS just received a letter from headquarters informing him that he made the highest score in the fourth district in the Sweepstakes Contest. W4TL, W4ACH and W4ABP are all newcomers in this district and, with the help of W4PD and W4CL, will soon be handling a lot of traffic. W4CL has just passed the exam for broadcast operator, and W4AFQ is now the holder of a commercial ticket. W4AAM reports that he is having trouble with his new station, but when his new parts arrive he will be on with a wallop. W4KI is using the xtal which he won in a contest at the Charlotte Convention. W4AJH works as substitute on sked with W1MK. Have just received application for ORS appointment from W4ABS down at Fort Bennings, Ga. W4KV and W4RZ have gone into amateur photography as a pastime and to help pass the days off while summer QRN is so bad. W4KV has moved his receiver into another room so he could get away from the hot sun and the remote control has worked out fine so far. The Radio Club at Atlanta had a meeting last week and elected officers. We are starting out another year and hope to have a great time together as all the old hams are active members. CM8UF down in Cuba seems to have a lot of messages every month, and we surely would like to have some news about the activities in that part of the world.

Traffic: CM8UF 220, W4KV 89, W4KI 70, W4BO 60, W4JD 51, W4ABS 44, W4AFQ 29, W4JL 18, W4AJH 10.

PORTO RICO-VIRGIN ISLANDS — SCM, E. W. Mayer, K4KD — Congratulations are in order for a very FB bit of activity this month. K4DK originated a lot of traffic from naval vessels in port. K4AKV obtained a few the same way. K4KD went after traffic by mail and got a lot. K4DK and K4KD both hit the BPL with a bang. FB. With the exception of 18 messages, K4KD handled all his traffic on his W1MK and W2FN schedules and claims a record, having sent as many as 82 messages to W2FN on one

QSO. K4AKV is helping out in off-frequency observation work on the 14-mc. band. K4KD received his "Sweepstakes Certificate" for work in the January contest. K4ACF reports from the sick bed. K4KD now offers reliable QSP to Haiti and Cuba through stations operated by naval operators in those countries.

Traffic: K4KD 884, K4DK 488, K4AAN 43, K4AKV 33, K4ACF 2.

FLORIDA — SCM, Harvey Chafin, W4AII-W4PAW — W4SK wins the state traffic banner this month with a total of 113. W4ACM, the Naval Reserve station is second. W4ACM and W4AII kept a schedule with the Yacht Haligonian, KGAW, during the races from St. Petersburg, Fla., to Havana, Cuba. Messages were exchanged every day and delivered to the crews' families, posting them on the race. W4MW is owner of the winning boat. W4MS was heard in Nicaragua. W4QA has been working a sked with a radiophone station in Chicago. W4QV has a FB fone set on the air. W4ADP, up at Crescent City, is applying for an ORS appointment. W4MM is a new prospect for an ORS appointment. W4AGR has a permit to use fone on 14 mc. W4AKA and W4JM are the only stations reporting from St. Petersburg. W4QL rebuilt his 852 transmitter and added a better power supply. W4AKH reports and also sends in a report for W4UJ. W4ALH, our newly appointed ORS and OBS, is getting out well. W4MF is using a very low power set on 7000 kc. W4JC is a new prospect for ORS, W4QN, that whispering saxophonist, reports. W4NB has been rebuilding. W4TK has been busy at WJAX. W4ABF has two UX210's perking. We are very glad to have W4TG's report again. W4UJ managed to let nine messages slip into his station. A new amateur radio club was organized this month. — The Gator Amateur Radio Club, W4GD, President; W4AAB, Secretary; W4MS, Treasurer. W4AGN is doing FB U.S.N.R.F. work. A real U.S.N.R. meeting was held in Tampa on April 26th. The speaker was Commander Wells from Orlando, who gave a brief summary of the Naval Reserve work. After his talk, a few questions were asked him and then the beans and coffee were served by Joyner, Martin and the SCM. W4AAB, the newest of the Gainesville stations, has a 210 going. W4WW is getting out pretty well with 201A's. W4ABL reports some DX lies. Hi. W4GD was QSO several foreigners. W4SD is rebuilding. W4IX and W4HX expect to have a station on the air very soon. W2BFH is moving to Tampa and is applying for an ORS appointment. W4OO is sending his OBS about twice a day. W4AO has been rebuilding. W4AGY and W4HY report. W4OZ is going on the air as a Naval Station and will keep the Thursday night skeds with the Naval net. The following are some of the amateurs at the P. A. Airways: W4BH, W4LO, W4NE, W4QV, W4ABG, W4ABA, W4AAO, W4SB, W4CR, W4PAA, W4GJ, W4NZ, W4AEO, W4AY, W4AF, W4BA, W4PI, W4GF, W9FNF, W1AMU, W6UA, W1YK, W8CTS, W5BNY, KFR6. Some of the PAA shop gang have been transferred to Brownsville on the Mexican division and are using the call W5BNY. The Miami Radio Club is picking up a bit despite the coming of summer. They gave a big blowout at W4AJD's house recently and about thirty were present.

Traffic: W4SK 113, W4ACM 102, W4MS 82, W4AII 79, W4QA 70, W4QV 60, W4ADP 57, W4MM 59, W4AI 50, W4AGR 34, W4AKA 30, W4QL 30, W4AKH 24, W4MF 76, W4JO 30, W4QN 12, W4NB 12, W4AEA 12, W4JM 9, W4UP 9, W4TK 10, W4ABF 9, W4TG 9, W4UJ 9, W4AAB 6, W4WW 6, W4OO 8, W4AO 8, W4AGY 2, W4OZ 1.

WEST GULF DIVISION

SOUTHERN TEXAS — SCM, Robert E. Franklin, W5OX — This will find us with some new Federal Radio Commission rules that we have long been in need of although quite a number of us have been practicing these rules already. It is hoped that everybody will put their shoulder to the wheel and make it a real pleasure to work on the air again by adhering to the new rules to the letter. W5AQY sends in a nice report as usual, but reports most of the bunch have spring fever. W5BKE is leaving Kerrville for Beaumont to attend the Radio School with a commercial ticket in view. W5BBY is to be congratulated on the way he has been handling the Schriener Institute traffic considering the fact that he is going to graduate on May 28th as Salutatorian of the Senior Class. FB. W5BKW has been getting out well. W5TD has been on a vacation in New Orleans. W5MS has been busy with the talkies this month. Quite a few of the hams have inquired about San Antonio's inactivity. How about it, OMs? W5JR has just had his shack rewired and promises to be back on the air real soon. W5BML is another new Houston ham. W5OX burned out his power transformer and will be off the air for a short time. W5AEA burned out a generator and is temporarily off the air pending repairs. W5IU has a new portable call, W5BOK. W5AE has one of the new Aero short-wave tuners. W5AFG kicked about my not printing Beaumont reports, but as yet I have never received a message report from there. Send them in, OM, we are always glad to have them.

Traffic: W5AQY 123, W5BKE 113, W5BBY 109, W5OX 23, W5TD 19, W5BKW 19, W5AJD 96, W5EI 62.

NORTHERN TEXAS — SCM, J. H. Robinson, W5BG — Well, fellows, this will be the last report from this SCM. It has been a pleasure to serve this section. W5WW challenges any ORS in Northern Texas in traffic handling. He reports DX good any time. W5RJ has a BCL op's license now. W5BAM is working in the daytime now so his skeds will have to be rearranged. W5HY has his set on the air again after the last move. W5ZY reports for the first time. We are surely glad to hear from you, OB, and hope you continue to report. W5AAE has been on the 170-meter band all winter. W5BG still keeps skeds with KFR6. The following stations have reported for the first time, but report no traffic: W5BEN at Amarillo reports for the following: W5WX, W5APB, W5VD, W5BEN, W5QE, W5ZH, W5BEI, SJ5BX, W5ALK. W5BEN has a 250 watt xtal set going now. W5BBH is going to apply for an ORS soon. W5DO at Jacksboro reports that he is looking for traffic and wants to know how and when to report. W5BBF is getting skeds lined up and intends to make the BPL next month. W5DF reports a scarcity of traffic up his way.

Traffic: W5WW 310, W5RJ 64, W5BAM 39, W5HY 16, W5BG 14, W5ZY 3.

OKLAHOMA — SCM, Wm. J. Gentry, W5GF — W5AUV has the high report of traffic this time. W5CB is second for the first time in ages. W5GF is busy with installation of electric refrigerators. W5APG is going good in the Naval Reserve. W5ALM is going to get back on the air very soon. W5QL is using fone and gets FB reports. W5DH has an OW op in order now. Tulsa is getting ready for the big Brass Pounder's meeting.

Traffic: W5AUV 54, W5CB 36, W5ALF 13, W5GF 7, W5AAV 2.

NEW MEXICO — SCM, Leavenworth Wheeler, Jr., W5AHI — W5AOD lays off for ten days and still makes the BPL easily on deliveries. That's three times straight. FB, says me. W5AJL accompanied the Clovis delegation to a musical convention in Las Vegas and, operating at W5ND, handled a lot of traffic to and from the delegates. While there, he and Dad and Bus of W5ND visited the SCM and put up a new pole. W5TV finds 3500 kc. OK for low power except for QRN. W5EF claims 14 watts on 14 mc. is better than 1 kw. on 7000 kc. W5AIE dropped in on the SCM again and says he's getting the traffic bug. W5BH is sorry now that he built a monitor — says ignorance was bliss. Hi. Most of the gang report very freaky conditions, strange skip effects, etc. Skeds have been all messed up by QSB at W5AHI and the bug is getting a rest. Possibly the solar eclipse due the latter part of April offers some explanation of the above.

Traffic: W5AOD 166, W5AHI 137, W5AJL 121, W5TV 40, W5EF 40, W5AIE 13, W5BH 9.

CANADA

MARITIME DIVISION

NOVA SCOTIA — Acting SCM, A. M. Crowell, VE1DQ — The boys seem to be concentrating on the 14-mc. band now. VE1AW and VE1GA have been testing on sked in the 3.5-mc. band. VE1BR has flocks of "W" stations calling him nightly on 14 mc. VE1AS just put through a "shady" deal with VE1CC whereby a UX210 changed hands. VE1DQ made two very nice contacts with ZL during the past month. Old timer VE1AR has reappeared with the usual kick and p.d.c. on 14 mc.

NEWFOUNDLAND — Acting SCM, E. V. Jerrett, VO8Z — VOQ is going to Northeast Greenland again this summer and is carrying a short-wave transmitter. More about that later. VO8AE will soon be eligible for WAC. VO8C works European countries consistently. VO8L has a new MOPA transmitter. VO8MC is rebuilding for high power. VO8AW built himself a new TPTG transmitter. VO8I has begun work in the 7000-kc. band and wants local QSOs. VO8A reports being heard in Austria on phone. VO8WG drove 180 miles on dog team and delivered some traffic. VO8Z took 39 messages from VO8WG at one sitting. Don't forget to try for VE QSO's Wednesday nights, boys.

Here is a chance for every Canadian to get a real kick. It has been suggested by the Publicity Manager of the T. & R. of the R.S.G.B. that each and every Canadian try to get a message of loyal greeting to their Patron H.R.H. the Prince of Wales. His birthday, as you all know, is on the 23rd of June. This year the 23rd falls on Monday which would enable the message to be received in England on Saturday or Sunday. Better still, as soon as you read this, write out your birthday message to the Prince and give it to the first British station you QSO. The T. & R. members will be on the watch for you and will be glad to QSP to destination. Let's put this over, fellows. We want greetings from every Province of the Dominion.

Summer is with us again — don't let dust collect. The 14-mc. band is at its best during the warm weather. Move your traffic on this frequency and get in on some of the good DX. Don't forget Canada Night every Wednesday evening at 11:00 p.m. E.S.T.

CANADIAN GENERAL MANAGER

ALEX REID, VE2BE

QUEBEC DIVISION

QUEBEC — SCM, Alphy L. Blais, VE2AC — With regret we record the passing of two amateurs, H. L. Robinson, VE2BC, killed in a plane crash, and J. McRobb, VE2AU, who died March 24th. Both were well known and esteemed by the amateurs of this division. VE2BE handled important traffic for the Byrd expedition stations WFA and WFBT. VE2BG has received his ORS ticket. VE2BB has been trying different antennas. VE2BD works DX and handles good traffic also. VE2BZ is working hard on 7 and 3.5 mc. to keep the messages rolling. VE2BJ has six operators with A. J. Cipriani as President. VE2AP will be on regularly after he gets his B. Sc. VE2BN, formerly of the Maritimes, does well and promises real work when his QRA question is solved. VE2AA is still going after DX on 14 mc. VE2CA gets his ORS ticket for the fine work done these last months. Mrs. VE2CA is better, and pounding the key as before. VE2HV is busy with the Company's many transmitters. VE2DN is using 'phone on 3550 kc. VE2AC got his Performance Certificate for the All-Section Sweepstakes Contest of January, 1930, scoring 950 points. I am glad to see how active this section is. Many skeds are kept faithfully, and we are confident that the All-Canada net will be a success some day. Our Canadian General Manager was in Hartford, May 2nd and 3rd, for the meeting of the A.R.R.L. Board of Directors. Don't forget the prizes for the best traffic totals for May to October.

Traffic: VE2AC 101, VE2BE 54, VE2BG 22, VE2BB 14, VE2BD 11, VE2BZ 8, VE2BJ 6, VE2CA 4, VE2BN 3, VE2AA 1.

ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE3FC — Central District: VE9AL again leads in traffic handled. VE3BC has contacted 1750 stations and handled 850 messages since October, 1927. VE3BP shows increased activity on 3600 kc. BP also reports two new arrivals on the air in VE3GK and VE3HE. Welcome, OMs. VE3DA reports another new station about to show its teeth in Belleville. VE3DW is still using his "flea-power" transmitter. VE3GM, the outstanding amateur 'phone station in Toronto, is showing the rest of the boys how it is done. VE3FC has been silent during the month. Eastern District: VE3XC descended to 14 mc. and worked a real list of DX. VE3XM is moving. Southern District: VE3HB and VE3FD are now devoting their time to CW DX operating, and to helping new hams get started. These new stations have been allotted the calls VE3GZ and VE3WM. Welcome, fellows. VE3CB has been moderately active, but reports conditions all the way from punk to rotten. Northern District: VE3HU is heading straight for an ORS appointment, with bigger and better totals. VE3DM also handles traffic. Move over, gang, and make room for VE3DM's brother-in-law, who has just been licensed as VE3HD. VE3AR has gone to Red Lake to operate CFJ, and will use his brother's portable set, VE3BH, from there. VE3BH will keep VE3AR on the air. VE3GD worked Spain on 14 mc. VE3CA has moved the outfit to a new shack. VE3AG is on regularly. VE3ET shot the works and will be off for a while. The Fort Williams Radio Club, with VE3GD as President and VE3FQ as Vice-President, is going strong with well over 200 members.

Traffic: VE3HU 26, VE3ET 10, VE3DM 8, VE9AL 43, VE3BC 18, VE3BP 11, VE3DA 9, VE3XC 2, VE3CB 4.

VANALTA DIVISION

ALBERTA — SCM, G. F. Barron, VE4EC — What is the matter, fellows? Your reports are as scarce as hens' teeth. VE4EI is our star station. Our prospective ham at Fort Saskatchewan expects his ticket soon. VE4AF is still experimenting with crystal. VE4HA handled an important message from Churchill in regard to some missing fliers. VE4DZ plans on busting the air with a portable. VE4GD made us a visit recently and VE4BV, VE4AF, VE4DZ and VE4EC took him for a tour of the city. VE4EC has rebuilt twice in the last month. VE4FJ is pushing his sigs out FB. VE4HM, VE4GT and VE4CU are on occasionally. VE4EA had his 28 mc. sigs reported in Ohio.

Traffic: VE4EI 53, VE4EC 3, VE4HA 1, VE4FJ 2, VE4EA 1.

BRITISH COLUMBIA — SCM, King Cavalsky, VE5AL — In Vancouver VE5AC manages to spear the odd message. VE5BM has xtal on 7000 kc. VE5BC has his new mast up. VE5CI is trying to get going again. VE5DR worked a K7 with a little old 201A. VE5FI blew his filter. Spring and golf have hit VE5AL. Victoria: The Victoria gang have been very active of late. VE5DU is getting xtal reports from the old slop jars. VE5CO puts R6 sigs to the ZLs. VE5HR hasn't worked any DX yet. VE5EC is on regularly. VE5CJ gets on occasionally. VE5EK is having difficulty with his heap. VE5DQ and VE5HK are rushing the YLs. Prince Rupert: VE5GT has skeds with VE5FS, VE5BM and W6EIB. VE5DX is a newcomer. VE5CM has moved. VE5AR is migrating to Kamloops. VE5BR at Savary Island still sticks to the 3500-kc. band. We are very sorry to hear that VE5AW has been under an operation, and hope he will soon be back on the air.

Traffic: VE5AC 8, VE5BR 1, VE5AL 7, VE5DU 9, VE5EC 6, VE5CO 3.

PRAIRIE DIVISION

MANITOBA — SCM, A. V. Chase, VE4HR — VE4DJ is on very consistently. VE4IC heads the section in traffic. VE4GQ has returned to his old love, the Ultraudion. VE4DK has been QRL with U exams. VE4BU has been granted an ORS appointment. VE4EK and VE4FN have had their certificates cancelled on account of inactivity. VE4BQ has obtained a Belgian 75-watt bottle for his station.

Traffic: VE4IC 17, VE4DJ 9, VE4BU 8, VE4GQ 5, VE4HR 3.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — The approaching summer is getting its dirty work in already, as is shown by the few reports. VE4IH comes through with his usual nice total. VE4BB and VE4GR say that the weather has been very bad. VE4CV of Swift Current is disturbing the ether with a 210. on 7 and 14 mc.

Traffic: VE4IH 43, VE4BB 17.

Calls Heard

W1BUX–W1CMX, D. H. and J. Borden, Cherry St., Fall River, Mass.

ac1bd ce2ab ce3ab ce3ag ce3bf ce5aa ce7aa cm2jt cm2sh cm5by cm5cx cm8uf ct1aa ct1bx ct1by ct1cw ct2aa cx1af cx1fb cx1fc cx cwk d4aar d4abg d4xn ear10 ear18 ear21 ear37 ear59 ear65 ear98 ear116 ear125 ear136 ei2d ei8b f8aap f8aw f8axq f8btr f8bx f8cher f8cs f8da f8dh f8dmf f8dot f8ef f8eo f8er f8esp f8ex f8fem f8fg f8fk f8fr f8gdb f8gi f8gon f8hip f8hr f8kz f8lx f8oa f8olu f8pam f8pmg f8pns f8prw f8rb f8rko f8sm f8swa f8toy f8wb f8whg f8wkz f8wrg f8yy ff8oxo fm8cr fm8gkc fm8jo fm8rit fo9sr freari49 g2no g2nz g2bm g2dt g2dz g2gf g2gm g2ip g2kf g2ma g2oa g2op g2ow g2un g5bd g5bj g5by g5bz g5is g5jo g5lw g5ml g5ms g5pj g5qa g5qv g5rs g5sk g5tz g5vm g5wk g5yg g5zn g6bd g6cl g6cr g6dw g6fd g6gc g6gs g6hp g6ia g6lk g6ivf g6nt g6ou g6pa g6qb g6rb g6vp g6wo g6wt g6wy g6xb g6xn g6xq g6yq g6za gi5hv gi5nj hnf8b hafkx hclfg hc1lc hc2jc hc2jm k4akv k4dk k4kd k6boe lu1ba lu1bz lu1jf lu2aa lu2ca lu2dj lu3de lu3dh lu3fa lu3fk lu3hc lu3pa lu4bi lu4dq lu5ac lu5bz lu5dj lu6aj lu6fc lu7je lu8dj lu8dy lu8en lu9ce lu9dt nj2pa oa4j oa4l oa4q oa4r oa4z oh7nb ok2ny on4ar on4bc on4fe on4fp on4ft on4gn on4hc on4hp on4jj on4jk on4ka on4my on4pj on4ro on4rs on4us on4vm on4wm oz7t oz7y pa4dw pa4flx pa4fp pa4qf pa4xg pk2aj pk3bm pylaa pylah pylaw pylbr pylcl pylcm pylcr pylfb pylia py2ad py2ay py2ba py2bg py2bk py2bm py2ic py2ig py2ih py2ii py2ik py2qb py2sb py3aq py3la py8ia sm6ua ve5aw vk2dy vk2ek vk2hc vk2hu vk2jz vk2nb vk2rx vk3cx vk3de vk3go vk3hk vk3lp vk3mo vk3pm vk3wo vk3xo vk4jh vk4rj vk5gt vk5it vk5hg vk5wr vk7dx vo8mc vo8z vq2bh vu2dr vu2sx x2x x9a z1lan z1lfc z1lfw z2ac z2gh z3aj zs1p zs2n zs2s zs4a zs4e zs4m zs4t zs5u zt1j zt1n zt1r zt1x zt5r zt5s zu1d zu5b zu6n zu6s zu6w qq1a fgz ctbj xearn xeft xc xos7aw wfa wfat

W3WG, Eugene B. DeTruck, aboard the S.S. "Angeles"

Between Bermuda and the Equator 7000-kc. band

w1abn w1ach w1adj w1afc w1afw w1aje w1ajk w1ajx w1amd w1bdi w1bes w1bet w1bgi w1bil w1bjl w1bnl w1bxl w1caa w1cdg w1cjd w1cpt w1cpt w1dz w1er w1fk w1gw w1id w1if w1lk w1mk w1nx w1og w1rv w1sz w1wl w2abe w2adc w2adl w2afw w2aii w2aiq w2ajp w2alu w2ane w2anx w2apk w2ard w2aru w2ase w2aun w2avm w2avo w2aws w2axk w2ayj w2azy w2bbq w2bda w2beq w2bfl w2bha w2bhr w2bkq w2bm w2bne w2boc w2bpg w2bpg w2brm w2bry w2bsc w2bsw w2buq w2bvc w2bvi w2bvk w2bwe w2bx w2bxj w2bxn w2bxw w2bzb w2caf w2cny w2cjt w2cuq w2cxl w2de w2dk w2fm w2fo w2ft w2hs w2jl w2kr w2ku w2le w2mq w2nl w2qf w2sc w2uf w2wz w2xam w2xb w3aeq w3aff w3aho w3aic w3ajt w3amg w3aog w3apf w3aru w3asg w3aup w3aus w3awm w3aws w3bkt w3bm w3bpi w3di w3ed w3hx w3hz w3la w3lu w3nk w3pc w3pq w3sb w3uh w4aci w4aef w4aft w4afw w4agr w4agw w4ahq w4ai w4aim w4aka w4ake w4akg w4akt w4akw w4alr w4arp w4ax w4cg w4fx w4gk w4gw w4hb w4hd w4hk w4hu w4jo w4kp w4lj w4lx w4mm w4nb w4oo w4pp w4sq w4sx w4uy w4vs w4vz w4wt w4wz w4zn w4zt w5aao w5ach w5ady w5aea w5agn w5akp w5ana w5aqk w5arg w5atm w5aux w5aza w5bam w5bek w5bg w5bhy w5bq w5cb w5cf w5eb w5fa w5fb w5fp w5iv w5jc w5jd w5mm w5no w5td w5ww w6ami w6amw w6axe w6axm w6bam w6bbk w6bh w6bkk w6bky w6bnc w6boq w6bqf w6bqq w6bqs w6btd w6btw w6bvs w6byb w6cbp w6cis w6ctk w6ctz w6csc w6deg w6dep w6dli w6dpj w6dpo w6dui w6dwi w6dzy w6edg w6edo w6eeb w6ehi w6eiz w6ejc w6ejh w6ejk w6eke w6ena w6eou w6esp w6ew w6fc w6jn w6qt w6ef w6xbb w6xd w7aax w7afl w7ah w7aht w7aiz w7qf w8adu w8aed w8aes w8ait w8ajn w8ald w8amb w8anh w8aqx w8arl w8bax w8bcf w8bcj w8bdv w8bed w8bfs w8bgt w8bgx w8bid w8bih w8bjo w8bly w8bm w8bno w8bnt w8bof w8bqp w8brb w8bti w8bv w8can w8cau w8ccs w8ccw w8cft w8cfw w8chq w8css w8cut w8cxv w8cyw w8dan w8dbs w8ddg w8dev w8dgt w8dhu w8dii w8dlg w8dma w8do w8drt w8dwm w8ft w8gz w8js w8kc w8kd w8ll w8lt w8nr w8oj w8ss w8wa w8wk w8ww w8yb w9acg w9acl w9ada w9aib w9aj w9ajo w9ajz w9akv w9akz w9amr w9ams w9amv w9aqh w9aqu w9aku w9auh w9aum w9axv w9azs w9axw w9bba w9bcs w9bdh w9ben w9bhh w9bhi w9bhw w9bly w9bmr w9bmw w9bnf w9bns w9box w9bqe w9btl w9bwk w9bwx w9cd w9cdh w9ceb w9cfa w9cfl w9cgh w9cjb w9ckz w9cnf w9cps w9cpy w9dbj w9dck w9ddo w9dfh w9dfs w9dft w9dga w9dgz w9dib w9dnh w9dol w9dti w9dwa w9dyb w9eaj w9ecz w9egu w9egx w9eiz w9elj w9ell w9exa w9ezt w9fts w9ftt w9ftz w9fyp w9gau w9gdh w9ggb w9ggh w9ggq w9gix w9gjs w9jq w9kd w9nr w9lf cm2jm cm5fc cm5fl cm7sh cm8uf cm8yb ct1cx cx7 ear9l f8dh f8fem f8hcl f8pam f8ror g5by g5ml haf4c hc1fc hc1lc k4kd k6ewb nn7c on4bc on4dj on4hm velam ve2ac ve2be ve2bp ve3bc ve3cz ve3dd ve3ll ve4gi zl1fc zl4xc jk w1adw w1ae w1aep w1afa w1ajd w1ajl w1akd w1ala w1asf w1axv w1aze w1bak w1bln w1caw w1cmx w1da w1dp w1jy w1kn w1lq w1og w1om w1pf w1qv w1ry w1tl w1uc w1vz w1we w1za w1zs w2aeb w2aes w2aib w2alp w2alv w2amm w2amr w2arh w2ary w2azc w2bda w2bec w2ben w2biw w2bjg w2bsf w2byr w2cjx w2el w2fp w2gj w2hj w2hq w2jc w2ov w2qn w2qp w2uk w2va w3aaz w3aiu w3aiz w3ajd w3aqi w3auo w3awn w3dh w3jr w3mc w3qw w4aay w4abr w4aef w4akt w4aq w4aqi w4cc w4fm w4fz w4mf w4ql w4tn w4we w5aee w5agg w5aom w5td w6auz w6bax w6kg w8aau w8adm w8aed w8arf w8aun w8axa w8axn w8bbl w8bem w8bjv w8bkp w8brh w8bvw w8cp w8djv w8dnu w8dui w8dwm w8dwv w8gs w8hx w8pl w8ss w8su w9ark w9cxw w9def w9eaj w9ecz w9ef w9ell w9enr w9eve w9exw w9faz w9ftz w9giy cx7af ear96 f8axq f8blg f8er f8fr f8tsn fm8smu g6vp g6za haf3c k4dk kfr6 lu2ea lu2dw lu3de lu3pa lu6aj lu8dy lu9dt nj2pa oa4j on4go oz5a py1aa py1aw py1cl py1cm py2ax py2ig py2ih py2ba py2bf qq1a ve2bm ve2ca ve3cm ve3eo ve3qs ve3sz vk4rb vo8mc x9a z1lan z12ac z13cm zl4ax zt6r zu6b zy6n

7,000-kc. band

Equator to Santos, Brazil.

w1afd w1anp w1asf w1axx w1mk w1mo w1qv w1rp w1rv w1sz w1zb w2afr w2alu w2alz w2amr w2apd w2awq w2axn w2bjo w2bng w2bqf w2bwx w2cxl w2fm w2nl w2qf w2uf w2wr w3adp w3adz w3aig w3asg w3aws w3ba w3bg w3bkt w3pf w4ahh w4ahl w4ahr w4aka w4alg w4aq w4ec w4ft w4gj w4hb w4pp w4ps w4vv w4we w5ae w5ana w6aaz w6bjb w6caf w6car w6cii w6tm w6yx w8aam w8aat w8adp w8alu w8axs w8ayh w8bif w8bls w8bno w8boo w8bps w8bqu w8bwi w8bwu w8cjt w8css w8cum w8cux w8dkt w8jm w8rj w8vx w8wi w9amk w9ayd w9azy w9bcs w9bkz w9bly w9bzq w9cbj w9cja w9cjb w9cjn w9cms w9evn w9dgz w9ebo w9ecz w9ehi w9eji w9eve w9ezb w9gdv w9ghw w9hd w9sm w9um w9yc cm8yb ear96 on4dj ve3cz

(*Continued on page 60*)

Correspondence

The Publishers of QST assume no responsibility for statements made herein by correspondents.

All-American Mohawk Malaysian Expedition

Base Camp, Poeroek-Tjahoe

Editor, *QST:*

Although Mr. Harry W. Wells (W3ZD, Chevy Chase, Md.), radio operator with the Expedition, has from time to time reported to the League through *QST* of the radio activities of the Expedition in Borneo, I wish to take this opportunity before we leave for the coast and PMZ is dismantled, to thank the American Radio Relay League for the splendid coöperation we have received in keeping up communication with the United States through members at home and abroad.

Sergeant Paul Holbrook, KA1AF, Ft. Mills, P. I.; Commander S. M. Mathes, KA1CY, Manila, P. I.; L. R. Potter, W6AKW, Lancaster, Calif., and Colonel Clair Foster, W6HM, Carmel, Calif., are the operators, Mr. Wells informs me, who gave him such generous support.

You have very likely heard by this time of the splendid service PMZ was able to render the government of the Dutch East Indies at the time of the assassination here of the military post commandant, Captain J. C. DeQuant, and the subsequent disturbance. Mr. Wells, through Station KA1AF and KA1CY was able to notify the garrison at Bandjermasin of the tragedy, and has since been handling all official reports regarding political consequences, etc., for the isolated post. There is a feeling here now that through this incident, made possible by the A.R.R.L., the Dutch colonial government will elevate the status of amateur radio operators in these great islands and license them just as our own government does members of the League. If this comes about we shall feel mighty proud, and I personally shall bring the matter to the attention of the Governor-General at the first opportunity.

— *Theodore Seelmann*

Pertinent Comment from Overseas

13 Seagry Road, London, E. 11

Editor, *QST:*

Your editorial in March *QST* hits the nail right on the head. To listen to the average W ham, one would hardly realize that such an excellent series of articles on modern station equipment had been so ably written by Mr. Hull.

It must be a great disappointment to the A.R.R.L. executives, as sponsors of Mr. Hull's work, to know that after twelve months' working under the new conditions, the position is so little changed.

Considering how easy it is to obtain a pure d.c. note, it really is surprising that a good 75% of the U. S. A. stations received on this side still sound like the proverbial band-saw.

With regard to "off-wave" working, only one British amateur to my knowledge has been heard by the authorities working outside the "band," and he found himself a B.C.L. again within twenty-four hours of the offense. This will show you the position in England.

Wishing *QST* every success.

— *Lawrence C. Fuller, G6LB*

The Far-Reaching Ham Spirit

Houlton, Maine

Editor, *QST:*

Last June I had the misfortune of being the victim of an auto accident which left me with a broken back. Up until a few weeks ago I have been confined to the house, enclosed in a cast, which made it impossible for me to do anything which required the least effort on my part.

It is during moments of trial and hardship that one appreciates the kindness and friendship of those about him. So through the medium of *QST*, I want to extend my sincere thanks and appreciation to all of my fellow hams who have been so kind and generous to me during my illness.

The fine spirit of fellowship extended by all those with whom I had the pleasure to work certainly helped very much in passing away what would have been many a long, lonesome hour. In all districts worked, especially the first and second, I found every ham a real sport, ever willing to do some little thing to make life more pleasant for me. The gang here at Houlton also stood by me in my trouble. The unseen amateur friend is certainly one of sterling worth.

73 from a very grateful fellow ham.

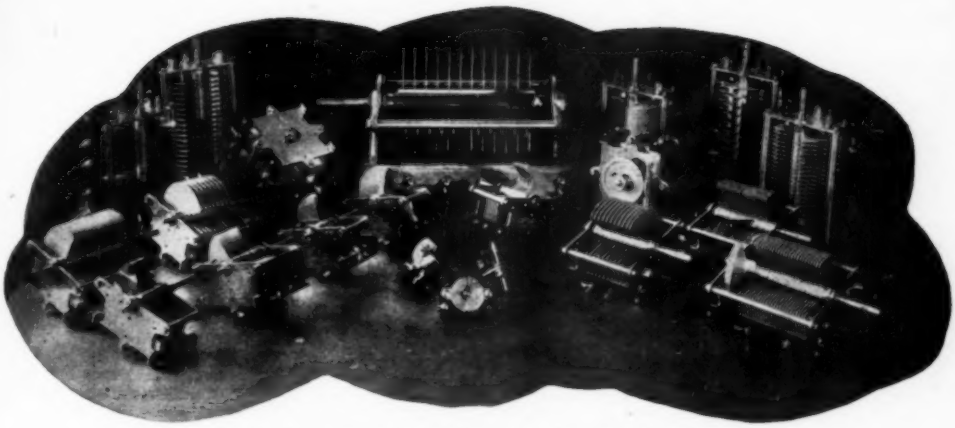
— *Phillip Clark, W1BKN*

Constructive Work on 'Phone

Olathe, Kans.

Editor, *QST:*

In response to a request published in *QST* for 1750-kc. stations to send code lessons, I volun-



More than a score of different Cardwell Condensers were used in equipping the Byrd Antarctic Expedition

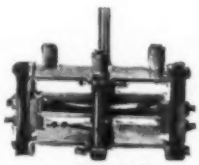
Be Right The First Time!

GUESSING may prove successful occasionally, but in the long run reliance on past performance proves the wisest course.

The Byrd Antarctic Expedition, now successfully concluded, used 25 different types of Cardwell condensers. The success attained in maintaining Radio Communication with home and between isolated units of the Expedition is well known, and no comment on our part can add to the glory of these achievements.

Cardwell condensers have always proved worthy of the confidence of winners and are worthy of *your* confidence. If you are in need of condensers you can play a sure thing and eliminate doubt—use Cardwells.

Send direct if your dealer does not stock. Literature sent on request.



The 201E

A 2 plate variable condenser having the stator plate readily adjustable to permit changes in maximum capacity ranging from 50 to 10 mmfds, with a constant minimum of 7 mmfds.

CARDWELL CONDENSERS

THE ALLEN D. CARDWELL MFG. CORP.
81 Prospect Street, Brooklyn, N. Y.

Since broadcasting began

"THE STANDARD OF COMPARISON"

Cunningham
RADIO TUBES

Name Integrity

is important in your
tube selection

For your mark of recognition, we have reproduced the characteristics that identify genuine CUNNINGHAMS.

Visible proof of in-built quality

E. T. CUNNINGHAM, INC.

New York Chicago San Francisco
Dallas Atlanta

teered. During October and the first part of November I, with the help of my sister, W9UA, sent 34 lessons, missing but one night, when lightning became so bad as to burn out the line telephone here. We conducted the lessons one-half hour in length, starting each one with alphabet review, then following with sentences sent slowly, and the last 10 minutes running the omnigraph. About 10 minutes divided into several periods was taken up by explanation and answering of cards and letters. At the conclusion reports were asked with promise of sending a card when I came on the air again. About 50 reports were received.

During November and December I built a new crystal controlled transmitter following many suggestions published in *QST*. The set uses two Type '52's as power amplifiers, modulated by two 845's.

With this transmitter completed I came on the air Christmas and up until March 1st sent 50 lessons of an average of one hour in length. The new transmitter practically eliminated BCL interference so I ran it from 7:30 to 8:30 p.m. and sometimes later. The lessons were conducted on same lines as before, by starting each with the alphabet, following with slowly sent sentences taken from the Handbook, then running the omnigraph from 7 words upward to about 15 words per minute.

Reports soon began to come in from far and wide; 39 states, Canada and Mexico have been heard from. The set reached out consistently 1000 miles in every direction and 50 per cent of the time, 1500 miles. Many have claimed 15 words per minute speed gained, while dozens have applied for licenses or appeared before inspectors. Others have not yet received action on examinations or applications. Besides these there were a great many operating on provisional licenses, capable of doing only about 6 words, who listened and gained up to 12–15 and more.

I write this to let you know that I have kept the schedules in spite of the fact that my sister, on whom I depended for help when I agreed to send, has been sick since December.

Anyone securing 25 or 30 of these lessons gained speed enough to read calls and make the grade for examination as proven from reports. I have sent each Friday and Saturday since March 1st just to give several of the last fellows getting on a little boost. Now agree with me that no 7- or 14-mc. man has done more to help out the hundreds of fellows who want a little lift getting started, or tell me who he is and how he did it and I'll go his method one better next winter.

Keep the good work up at Headquarters.

— *Marshall H. Ensor, W9BSP–W9UA*

Office Supervisor of Radio,
2116 L. S. Smith Bldg., Seattle, Wash.

My dear Mr. Warner:

Believing that you may be interested in some of the amateur inquiries reaching this office, I am forwarding the enclosed letter, dated March 25, 1930.

— *Edwin W. Lovejoy, U. S. Supervisor of Radio, Seventh Radio District*

SPRAGUE
Electrolytic and Paper Condensers
RMA Show
Auditorium — Booth D-50
Atlanic City
JUNE 2nd to 6th

The "Little GIANT"

Capacity
8 MFD
Peak Voltage
430 DC
Can Negative

$2.50

HERE'S the real "surprise package" of the radio industry. The new, perfected Sprague electrolytic condenser — with the exclusive one-piece, rolled-edge anode — concentrating 8 MFD capacity into a space of only 1⅜" diameter and 5" long.

Individual socket mounting makes it instantly adaptable to any circuit. Protected vent integral with top prevents all liquid leakage. And because there isn't a soldered or welded joint anywhere — the Sprague gives you in practical performance the maximum of efficiency.

It has the endorsement of the leading "hams" for transmitting use (names on request). Write for information of special interest to "hams."

SPRAGUE SPECIALTIES CO.

Offices & Laboratories: Quincy, Mass.
Factories: North Adams, Mass.

SPRAGUE
Electrolytic CONDENSER

it would be

FATAL

to lose

Control

BARRED wire – trenches – dug-outs – a field set and a thin strand of wire. The difference between control and lack of control may spell life or death to an entire brigade. It's a far cry from No Man's Land to the comforts of your home.

But even in your radio set . . . control plays a vital part . . . and it has been the privilege of CENTRALAB to furnish the volume controls of millions of radio receivers.

Is your radio — CENTRALAB equipped?

Write Dept. 320-F for Free Booklet, "Volume Control, Voltage Control and Their Uses"

Centralab

Central Radio Laboratories

Dept. 320 F, Keefe Ave., and Humboldt

MILWAUKEE, WIS.

TRANSMITTING and RECEIVING PARTS and TUBES . . .

Biggest Discounts to Amateurs

Every make of AC and DC parts, kits, accessories, and cabinets of merit always in stock . . . 12 brands of tubes.

Free Technical Information and Advice by Experts.

Buy in Seattle at Chicago and New York Prices

WEDEL COMPANY

SEATTLE, WASH.

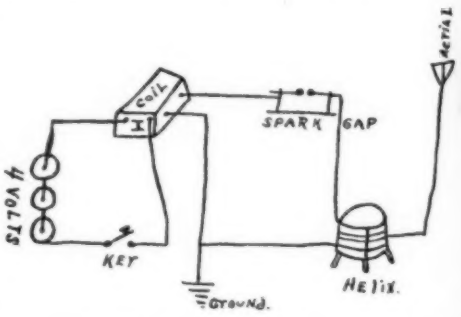
RADIO and ELECTRICAL JOBBERS

SINCE 1888

Federal Radio Supervisor:

Dear Sir:

Am enclosing a diagram of spark transmitter.



Is a license required to operate such a set and is it unlawful to operate such a set within the state?

Would you please send me a complete set of rules governing radio communications?

Thanking you in advance.

A Suggestion

Detroit, Mich.

Editor, *QST*:

I have just read with interest the letter by Charles Manley of Summit, N. J., with reference to rag-chewing. In this connection it occurs to me that it is about time *QST* did something to bring together those amateurs who are not primarily interested in traffic. I think this everlasting "QRU C U later," coming as it usually does immediately after two stations have made contact, is the main reason why so many amateurs have turned to radiophone for a change.

Personally I am most interested in experimental work and have been devoting a considerable portion of my spare time during the past twelve months to aircraft radiophone communication experiments. This leaves me comparatively little time for ham work, and while I am always glad to accept an important message for relay or delivery, I do not feel that I must accept the unimportant messages which take up most of the time of our traffic stations. Granting that traffic work is excellent training for any operator, it cannot be indulged in consistently except by operators who can keep regular schedules and be on the air for a reasonable time at least every other day.

My amateur interest is about equally divided between telegraph and telephone but I think probably I get the most enjoyment out of a good rag-chew or exchange of interesting information. I also like to hook up with other amateurs who are willing to check transmission tests and who are competent to give an accurate report. During the past twelve months, however, I have not QSO'd more than fifty amateurs of this type and 75% of them have been working in the 14,000-kc. band.

In the past it has been suggested that a special

A New Line Of Transformers

Again ACME leads in transmitting apparatus

Here's a brand new line of transformers and chokes for transmitting stations. Back in 1920 when C. W. power began, Acme was the first to have the transformers ready for the tubes. Again Acme pioneers in transmitting apparatus, this time with a line developed after years of experience and by studying the needs of the amateur and the transmitting station.

Note the construction of this new line and some of the features exclusive to Acme. There's the porcelain insulators on the high tension terminals; theres the strong metal case in which the transformers and chokes are submerged in insulating compound.

All these transformers and choke coils are insulated to (and tested at) 5000 R. M. S. (7000 peak) between all high voltage windings and ground. No more worry about the power supply failing just when you have an important message.

Send for Bulletins 110 and 111 and learn all about this new line. You'll want to have this information on hand when you get ready to improve your station. Just fill in the coupon below and mail it to the Acme Apparatus Corporation, Cambridge, Mass.

ACME
~for transmission

ACME APPARATUS CORP.
Cambridge, Mass.

Gentlemen: Please send me a copy of Bulletin 110-111. Dept. Q-1

Name .....

Address .....

City ..... *State* .....

Can you turn back the pages of time?

If you have the 1920 series of *QST* — and probably you have not — you are one of the few. Even 1922 and 1923 copies are getting scarce. And copies before the war! Well, let's change the subject.

A few years from now *QST* copies of to-day no doubt will be just as scarce. Every reader of *QST* appreciates its reference value. We are daily reminded of this fact by the many requests we get for back copies, many of which we cannot supply.

Next year — or probably later this year — you will be looking for a certain 1930 issue of *QST*. You had better resolve right now to keep your copies in a

QST Binder

Note the wire fasteners. Unnecessary to mutilate copies. Opens and lies flat in any position.

One-fifty each postpaid

A binder will keep your *QST*s always together and protect them for future use. And it's a good-looking binder, too.

QST

1711 Park St., Hartford, Conn.

general call be assigned to experimenters or ragchewers and I strongly second this suggestion.

— *C. H. Vincent, W8RD–W8XB.*

Hi!

735 Purdy St., Birmingham, Mich.

Editor, *QST:*

You might tell me, if you can, whether the last vestiges of our famous and virulent fever ever leave the veins of an erstwhile victim. For lo, I had thought the persistent bug completely gone, but his devious ways surpass the understanding of man, selah! Yesterday I came across *QST* in the library, and turned its familiar but strangely different pages. Therein I came across Reddington's picture of a station of by-gone days. My eyes felt slightly misty and my throat a little tight.

A few years ago I was one of the regulars and although always more of an experimenter than operator, the love of the hobby is about the same, as you know, in both. Putting myself through college and working at the same time has taken all of my energy for the past four years. But it's all over now, and I'm a full-fledged liar — I mean lawyer.

The other night, however, I must needs tear the broadcast receiver to pieces, and put it together again. There's something infectious about the feel of a soldering iron, and the smell of burning resin.

Oh well! Send me that Handbook. I've gotta see where things stand.

— *John C. L. Cowen, Ex-8BYR.*

The Off-Frequency Problem

Dryden, N. Y.

Editor, *QST:*

For the past few years *QST* has been stressing the perils of off-band operation of amateur transmitters. This has been especially true during the last year, since off-frequency operation has become an international crime. This has been a good thing and been heeded by those who possess anywhere near the normal intelligence.

However, recent developments seem to indicate that there are a few in this amateur radio game who do not seem to be able to comprehend the magnitude of the offense of off-frequency operation. These few should realize that someone is going to get hurt — hurt bad. The worst of it is that the innocent will have to suffer with the guilty if this situation continues. These people who continue to operate out of their proper channels should realize that they are almost sure to be causing interference with very costly services. Those who operate transatlantic stations are losing money when their operation is interrupted. I am told that it costs about five thousand dollars an hour for each hour these stations are caused to stand by.

Now this brings us to the question: what will be done about it, who will do it, and what can the amateurs in general do about it? In the first place the government will have to take drastic

RCA

RADIOTRON
UV — 849

MODULATOR, AMPLIFIER *or* OSCILLATOR

AMATEURS who operate phone transmitters of medium power will find that Radiotron UV-849 is a very effective modulator. Its characteristics have been so designed as to make it particularly suited for use with oscillators operating at plate voltages of from 2000 to 3000 volts. The high quality of phone transmission obtainable through its use will gratify the most exacting amateur.

Then too, Radiotron UV-849 will give remarkably smooth and stable performance when used either as an oscillator or as a radio frequency amplifier at frequencies below 3000 kilocycles (wave-lengths above 100 meters).

Filament Volts 11 Filament Amperes 5 Amplification Factor 19

Modulator		
Plate Volts	2000	3000 Max.
Grid Bias Volts	-87	-132
Plate Current (ma.)	60	100
Plate Resistance (ohms)	4000	3200
Plate Dissipation (watts)	300	Max.
Oscillator Input Watts for each UV-849 (Mod. Factor 0.7)	110	350

Oscillator and RF Power Amplifier	
Max. Operating Plate Voltage	
Modulated DC Plate Volts	2000
Non-modulated DC Plate Volts	2500
Max. DC Plate Current (ma.)	350
Max. Plate Dissipation (watts)	400
Power Output (watts)	350

ENGINEERING PRODUCTS DIVISION

RCA VICTOR COMPANY, INC.

233 Broadway, New York, N. Y.

Representatives in Principal Cities

Can you turn back the pages of time?

If you have the 1920 series of *QST* — and probably you have not — you are one of the few. Even 1922 and 1923 copies are getting scarce. And copies before the war! Well, let's change the subject.

A few years from now *QST* copies of to-day no doubt will be just as scarce. Every reader of *QST* appreciates its reference value. We are daily reminded of this fact by the many requests we get for back copies, many of which we cannot supply.

Next year — or probably later this year — you will be looking for a certain 1930 issue of *QST*. You had better resolve right now to keep your copies in a

QST Binder

Note the wire fasteners. Unnecessary to mutilate copies. Opens and lies flat in any position.

One-fifty each

postpaid

A binder will keep your *QST*s always together and protect them for future use. And it's a good-looking binder, too.

QST

1711 Park St., Hartford, Conn.

general call be assigned to experimenters or ragchewers and I strongly second this suggestion.

— C. H. Vincent, W8RD–W8XB.

Hi!

735 Purdy St., Birmingham, Mich.

Editor, *QST:*

You might tell me, if you can, whether the last vestiges of our famous and virulent fever ever leave the veins of an erstwhile victim. For lo, I had thought the persistent bug completely gone, but his devious ways surpass the understanding of man, selah! Yesterday I came across *QST* in the library, and turned its familiar but strangely different pages. Therein I came across Reddington's picture of a station of by-gone days. My eyes felt slightly misty and my throat a little tight.

A few years ago I was one of the regulars and although always more of an experimenter than operator, the love of the hobby is about the same, as you know, in both. Putting myself through college and working at the same time has taken all of my energy for the past four years. But it's all over now, and I'm a full-fledged liar — I mean lawyer.

The other night, however, I must needs tear the broadcast receiver to pieces, and put it together again. There's something infectious about the feel of a soldering iron, and the smell of burning resin.

Oh well! Send me that Handbook. I've gotta see where things stand.

— John C. L. Cowen, Ex-8BYR.

The Off-Frequency Problem

Dryden, N. Y.

Editor, *QST:*

For the past few years *QST* has been stressing the perils of off-band operation of amateur transmitters. This has been especially true during the last year, since off-frequency operation has become an international crime. This has been a good thing and been heeded by those who possess anywhere near the normal intelligence.

However, recent developments seem to indicate that there are a few in this amateur radio game who do not seem to be able to comprehend the magnitude of the offense of off-frequency operation. These few should realize that someone is going to get hurt — hurt bad. The worst of it is that the innocent will have to suffer with the guilty if this situation continues. These people who continue to operate out of their proper channels should realize that they are almost sure to be causing interference with very costly services. Those who operate transatlantic stations are losing money when their operation is interrupted. I am told that it costs about five thousand dollars an hour for each hour these stations are caused to stand by.

Now this brings us to the question: what will be done about it, who will do it, and what can the amateurs in general do about it? In the first place the government will have to take drastic

RCA

RADIOTRON UV—849

MODULATOR, AMPLIFIER *or* OSCILLATOR

AMATEURS who operate phone transmitters of medium power will find that Radiotron UV-849 is a very effective modulator. Its characteristics have been so designed as to make it particularly suited for use with oscillators operating at plate voltages of from 2000 to 3000 volts. The high quality of phone transmission obtainable through its use will gratify the most exacting amateur.

Then too, Radiotron UV-849 will give remarkably smooth and stable performance when used either as an oscillator or as a radio frequency amplifier at frequencies below 3000 kilocycles (wave-lengths above 100 meters).

Filament Volts 11 Filament Amperes 5 Amplification Factor 19

Modulator		
Plate Volts	2000	3000 Max.
Grid Bias Volts	-87	-132
Plate Current (ma.)	60	100
Plate Resistance (ohms)	4000	3200
Plate Dissipation (watts)	300 Max.	
Oscillator Input Watts for each UV-849 (Mod. Factor 0.7)	110	350

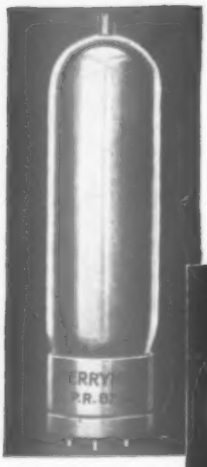
Oscillator and RF Power Amplifier	
Max. Operating Plate Voltage	
Modulated DC Plate Volts	2000
Non-modulated DC Plate Volts	2500
Max. DC Plate Current (ma.)	350
Max. Plate Dissipation (watts)	400
Power Output (watts)	350

ENGINEERING PRODUCTS DIVISION

RCA VICTOR COMPANY, INC.

233 Broadway, New York, N. Y.

Representatives in Principal Cities



FOR PURE D.C. POWER SUPPLY

P. R. 872

Fil. Volts - - 5
Fil. Amps. - - 10
Peak Inverse Volts - - 5,000
Peak Plate Amps. - - 2.5
Voltage Drop - 15
Overall Length - 8½"
Overall Diam. 2-5/16"
Price - - $18.00

P. R. 866

Fil. Volts - 2.5
Fil. Amps. - 5
Peak Inverse Volts - 5,000
Peak Plate Amps. - 0.6
Voltage Drop - - - 15
Overall Length 6½"
Overall Diam. 2⅜"
Price - - $8.00

UNDER the new regulations all amateurs must use an adequately filtered D. C. current supply.

P. R. 866 and P. R. 872, both mercury vapor rectifiers, besides emitting a wave form easy to filter, furnish a stable source of plate voltage—full load or no load, because both tubes possess a low and practically constant voltage drop. The unusually long life of the P. R. 866 and P. R. 872 is due to the low operating temperature of the oxide coated filament combined with the extremely low voltage drop resulting from their mercury content.

Use these Perryman rectifiers, famous for their rugged strength, in bringing your station in line with the new regulations.

Attractive prices for licensed amateurs

PERRYMAN ELECTRIC CO., Inc.,
4901 Hudson Blvd., North Bergen, N. J.

Enclosed please find money order / check for $.....for
..... P. R. 872 at $18.00. ..... P. R. 866 at $8.00.

Name.....Station.....
Street.....
City.....State.....

action, for this sort of thing cannot be allowed to go on. Amateurs must realize right now that something has got to be done — and done quickly. It must be realized that the surest way for the government to correct the problem is to prohibit amateur radio entirely. This puts the problem in the hands of the amateur to correct his own problems, and at once, if he is to continue to exist.

The air will have to be policed, and by the amateurs themselves. I would like to suggest that a number of amateurs, who possess the necessary frequency meters to determine the limits of the bands, be appointed by the A.R.R.L. to act as police of the amateurs, in much the same manner as the Official Broadcasting Stations are appointed.* These stations could notify the offending stations and also the Radio Inspectors. I am sure that if this were done, and the amateurs knew that they were being watched and reported, there would be very little off-frequency operation.

Let me say that in all fairness to the conscientious amateur, something has got to be done about these outlaws. Amateurs should remember that it is the duty, according to law, of each and every one to report any of these violators that they chance to hear. If they do not they themselves are equally guilty with the offender. This business is a serious thing — let us get under way right now and somehow, someway do away with this off-frequency business.

— *John T. McWatters, W8CBK.*

* The A.R.R.L. Official Observers, two or more in each Section, do just this work, their reports being coördinated at Headquarters so that necessary action may be taken against persistent and flagrant offenders who jeopardize amateur privileges. — EDITOR.

Calls Heard

(*Continued from page 51*)

14,000-kc. band

w1aaf w1avn w1bbe w1bil w1bl w1cek w1cow w1da w2adp w2ajj w2amm w2aow w2bbc w2bia w2byr w2exl w2dta w2ff w2ja w2ov w2rs w3aiz w3dh w4we w8ced w8lo w8nz w9bef w9def w9dhp w9dgz w9eap w9wt ce3ci et7aa ex7ae f8ex f8fem f8swa g2gm g5by g5ml g5wt g6wt lu1bz lu2dj lu2fi lu3fa lu7je lu8dj lu8dy on4q on4bt on4hj on4jj pylah pyied py1cr py2ad py2ak py2ay py2az py2ll py2ik py3ak py3aq py8ia ve2bd zs4m cxewk

W6EQO-W6BBY, F. C. Thompson, 155 N. Canyon Blvd., Monovia, Calif.

1759-kc. 'phone

w9byq w5kq w9bfx w5bky w9xv w9dky w9bfy

W2AJP, Norman B. Krim, 227 Haven Ave., New York City, N. Y.

cm1by cm2xa cm8lc cm8uf cmh2 cmz51 et1bd et1cp et1kg d4aez ear52 ear113 f8dz hc1fg hc1lc k4kd k5dd k6eb ok1na on4uy vk2hk vk4hu vk2ns vk3bq vk3ga vk3jk vk4bh vk4do vk5it vk7eh zl1bn

Elliott C. Hagar, 30 Adams Ave., West Newton, Mass.

14,000-kc. band

ce1ah ce3ag cm5fl cm8ux w6ekw w7jc cm8yb et1aa et1bx et1by et1cw ex1af ex7 d4rh ear21 ear96 ear98 ei2d ei8b f8aw f8dmf f8er f8gyn f8hr f8kz f8lgb f8gyn f8hr f8kz f8lgb f8sm fm8er fm8gke g2fs g2ip g2oq g5by g5bz g5ml

Model 301 Voltmeter with 2500 or 3000 Volt Scales.

Model 301 Milliammeter 100, 200 or 500 M.A. Scales.

Model 301 Rectifier Meter for measuring A.C. in plate supply — 500 Microampere A.C. Scale.

Be prepared to meet the NEW REGULATIONS

ONE of the new regulations which the Federal Radio Commission has recently adopted with reference to the amateur is that he must keep an accurate station log showing, among other things, the input power to the last amplifier stage in the case of a multi-tube transmitter, or the watts input to a self-excited oscillator.

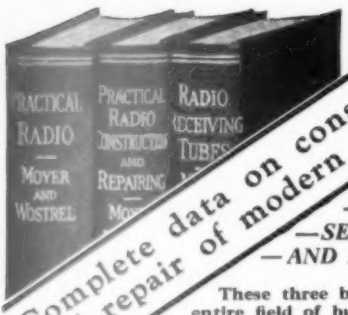
The new regulations also state that the amateur must use "an adequately filtered direct current power supply or its equivalent."

These regulations now in effect require that the amateur should be able to properly adjust his equipment to conform with them. But before the amateur can do so he must be provided with meters of suitable characteristics and proper ranges for accurately indicating the voltages being applied to his tubes and the current he is drawing from them.

For this service Weston offers three new instruments of the famous Model 301 design equipped with Bakelite cases — shown in the illustrations. For complete descriptions and instructions in the use of these meters write to the factory direct, addressing your inquiry to the Radio Engineering Department.

Weston
PIONEERS SINCE 1888
INSTRUMENTS

Weston Electrical Instrument Corporation **602 Frelinghuysen Ave., Newark, N. J.**



Complete data on construction and repair of modern radio sets

—for
—DEALERS,
—SERVICEMEN,
—AND AMATEURS

These three books cover the entire field of building, repairing and "trouble-shooting" on modern broadcast receiving sets. The Library has been brought right up-to-the-minute in every respect, including the very latest developments in the design and manufacture of equipment. The recent interest in short wave reception is reflected in a section which deals with the construction of this type of receiver.

THE RADIO CONSTRUCTION LIBRARY

Three Volumes, 6 x 9, 993 pages, 561 illustrations

THESE three books embody not only a thorough home-study course, but a ready means of reference for the more experienced radiotrician. Step-by-step information is given on wiring, "trouble-shooting," installation and servicing to get the best tone quality, distance and selectivity in broadcast reception from all types of sets.

Data is given on equipment, such as loudspeakers, antenna systems, battery eliminators, chargers, vacuum tubes, etc. The text is profusely illustrated throughout.

NO MONEY DOWN — SEE THESE BOOKS FREE
Simply clip and mail this coupon

McGRAW-HILL FREE EXAMINATION COUPON

McGraw-Hill Book Company, Inc.
370 Seventh Avenue, New York

You may send me the **Radio Construction Library**, three volumes, for 10 days' free examination. I agree to remit an initial payment of $1.50 at the end of 10 days and $2.00 a month until the price of $7.50 is paid — *or* — I will return the books at the end of ten days.

Name .....
Home Address .....
City and State .....
Position .....
Name of Company *QST*-6-30

Balkite

Chargers · Eliminators
Radios

PARTS AND SERVICE

ELECTROLYTE

WRITE FOR INSTRUCTIONS

A. F. MARTHENS COMPANY
Factory Representatives
Tel. Cortlandt 4489 54 Dey Street, New York

g6vp g6wo g6yt haf8b he1fg he2jc he2jm haf8b k4kd k6ewb laig laih lu3fa lu3pa lu5ac lu9dt nj2pa nn1nic oa4j oa4l oa4q on4r on4fp on4ft on4gn on4hp on4jk on4my on4vu oz7y pa0qf py1aa py1aw py2ik py2az py2bg ve5ao ve5aw vo8ae vo8aw vo8mc xig xwim zl1ao zl2bx zl4ao zs4e zu6n

ex-W3AVJ, J. G. Houck, 319 Walnut St., Pottstown, Pa.

14,000-kc. band

g2gm g5by g5ml g6rb g6ut f8ex f8fg f8he fm8rit on4jj on4hp on4ro ear10 ear37 ear96 ear98 d2cc d4rh ct1bx ct1by ce3ag lu2dj lu3de py1cm py2bf he1fg k7mn cm8uf ve1am vaco ve1bp ve1bx ve1ck ve1gk ve1gl ve1cu ve1ic ve1acl w6bam w6cln w6cxw w6dcv w6eak w6egh w6ejc w6ff w6nc w6ua w7afr w7alb w7ff w7fh w7fl w7li w7ag w7vy pa0zf

14,000-kc. 'phone band

w4agr w9anz w9qy

7000-kc. band

cmz53 k4kd k5do x29a hafkx w6ac w6bhy w6bi w6bnc w6by w6car w6cjn w6cxe w6dni w6doz w6dyn w6eks w6etj w6ks w7ahw w7nv w7vy

3500-kc. 'phone band

w3cv w3jz w3aex w2gj w2iu w8azk w8aju

W3AFK, Mr. J. Lawrence Evans, Jr., Daniel School Observatory, Franklin and Marshall College, Lancaster, Pa.

w1aar w1aky w1cgr w2aca w2amb w2apf w2bec w2bo w2boz w2bp w2ckj w2fr w2ga w2iu w2ji w2ju w2qn w3ain w3as w3avw w3cgb w3cz w3jf w4hn w8ahz w8aos w8br w8bwx w8cwu w9bg w9elx w9nm

W2CBB, H. J. Conti, 15 Harbor Terrace Drive, Rye, N. Y.

7000-kc. band

w6ahp w6akd w6akf w6aes w6awp w6bam w6bas w6bfs w6bgf w6bqq w6by w6cgx w6cii w6crz w6cto w6cxw w6czr w6dcu w6dhc w6dpj w6dyj w6dzu w6ebg w6ec w6eke w6ew w6ky w6sf w6yx w7acf w7ahw w7nr k4aan k4acf k4kd d4aez cm2jm cm2ro cm2xc cm5fl cm8uf nj2pa nm9a nmxa nn1nic nn7nic ve1da ve2bb ve3bt ve3gt ve3xk ve4cu ve9ap ndb waq

W8LA, Ralph E. Jackson, Box 226, Frankfort, Mich.

7000-kc. band

ti2rs k5dd k4dk k4kd k6ewb k6alm cm8yb cm8lc cm8dc he1fg zl1ft zl1fc zl2dg zl2ac zl2bg vk2jh vk2hm vk2bl vk3hu vk3pr vk3wx vk3jk vk3pm vk4bh vk5it vk5hg vk5jo vk5wr vk7eh pxr g5ml

14,000-kc. band

qq1a py1aw

W1ZB, Carl J. Madsen, Chicopee Falls, Mass.

7000-kc. band

w5nd w6axm w6bqk w6cbp w6cnn w6cug w6dis w6dpj w6dyn w6eva w6cxw w6equ w7acf w7fb w7lz w7vy w7aag cm8yb fl1aw nj2pa

14,000-kc. band

w6aqj w6cyi w6dev w7be w7na w7ty cm5cx cm8uf ct1bx he1fg he1lc k4akv lu2aa lu3dh lu4da lu5ak oa4j on4au ve4hg ve4ic vo8mc

W2BKZ, Charles T. Kolz, aboard S.S. "Toltec," United Fruit Co. Steamship Service

Off Florida coast

7000-kc. band

w9azy w3arp w8np w9ph w8hv w9eph w3amz w3bnu w5am w8rt w5za w2dp w8bgx w9kd w3anh w8cuq w9ebo w4m w8uf w4ik w1bjl ve3cz

At anchor, Puerta Cortez, Jan. 31, 1930

w5ave w2bai w3aws w4ei w2ags w4gd w8lt w5ajl w8wj w1ahl w2cvj w8aav w5aea w4rz w5aqy w8ddg w4qe w8gt w9ftt w8lt w9ahc w9bhh w2ard w3awm w2gg w5ae w8azq w5bdd w9fqs w9kb w8afm w2aof w4afw w6cqk w2bec w4hz

"We found over a period of two years that CeCo Tubes were the most profitable to handle in more than one way."

ALBERT A. LIST, List Brothers Distributors, Fall River, Mass.

Increasing use of high-quality phone transmitters by amateurs created demand for rugged, long-lived, powerful modulator tubes ... capable of withstanding heavy overloads and high voltages. The new CeCo 250 Tube with its rugged filament, high emission, small grid current and super vacuum is well adapted for this service.

FRANKLIN S. HUDDY, Assistant to Chief Engineer, CeCo Manufacturing Co., Inc., Providence, R. I.

DO YOU KNOW?

1. The CeCo million dollar factory of 3½ acres is the largest and most modern plant in the world devoted exclusively to the manufacture of radio tubes.

2. CeCo has pioneered in such tube achievements as the B-409, B-406, "G," "H," "K," Hi-Mu, the A.C. Screen Grid 224 tube and the A.C. Pentode.

● CeCo Tubes are licensed under patents and applications of Radio Corp. of America, and affiliated Companies.

CeCo ***1930 Radio Tubes***

Do You want to be a High Class Radio Operator?

You can be a Clear, Fast Sender, able to work with the best of them. You can be a Rapid, Accurate Receiver, able to copy the fast stuff with pen or typewriter. The Successful Methods used by the fastest and highest paid Radiomen are taught to you in

The Candler System of High-Speed Telegraphing

It is a Post Course of intensive training for developing Receiving and Sending Speed quickly through Scientific Methods (not trick theories). It trains the Brain, Muscles and Nerves to **Co-ordinate** in doing fast, accurate work. It develops the power of **Concentration**; gives you **Confidence** by making you sure of yourself at all times. No matter what your speed now is, we guarantee to increase it.

In big land stations and on ships at sea are successful operators who have taken and are taking the **Candler System**. "I owe my speed (55 wpm) to your **System**."—Theo. McElroy, World's Champion. "Can copy fast stuff 3 to 5 words behind easily. Radio-Typing Course is best for radiomen."—Raymond H. Bell, **U.S.S. Idaho.** Thousands of letters like these pour into our offices from all over the world. *There's no substitute for the* **Candler System** *of High-Speed Telegraphing.*

If you want to get out of the "slow class" and do something, write for further information about this great **Course** and what it has done for over 45,000 operators. Give your present speed and tell us what you want to accomplish. Also ask about Radio-Typing Course.

The CANDLER SYSTEM CO.
Dept. RL.
6343 South Kedzie Avenue Chicago, Illinois

REL

POWER SUPPLY

All Amateur Stations are now compelled to emit a pure tone signal. This can only be obtained by use of an efficient Power Supply.

REL CAN ASSIST YOU WITH YOUR POWER SUPPLY PROBLEMS

WRITE FOR LITERATURE

RADIO ENGINEERING LABS.
INC.
100 WILBUR AVENUE
LONG ISLAND CITY, N. Y.

w9apd w6abd w6cgx w9dce w8ke w8bkp w2caz w2pc wt4p w3bsj w8duw w9bkz w3ake w9dwr w5bhq w9tey w4ahq w5akp w4hd w5bex w4em em1by nn1nic x1nq em8yb zz1bb x5z

W1MS, Charles H. Horton, 173 No. Adams St., Manchester, N. H.

14,000-kc. band

ce5na em5cx em8uf ct1aa ct1bx f8cs f8da f8ex f8fr f8fk g2no g2kf g5by g5bz g5ml g5mz he1le he2jm he2jo k4kd lu3dn nj2pa oa1kc oa4r on4ft on4gn on4hc on4jj py1ca py2hn qq1a ve2be ve3rf ve4bu ve4bx ve4fk ve4fr ve5ao vk3ao vk3dy vk3pa zxda

W9ASV, Charles E. Perry, Motor Route 3, Box 821, Joplin, Mo.

ce1ai ce2ab ce2ac de2ak ce2bm ce3bf ct1bx ct3ab f8aqp f8er f8ep f8fc f8fd f8hl f8hr g5by g5yg g6hp g6xb kh6i k4ni k6etf no4uu py1aa py1aw py2ak xpaoja xpaozz xj9 x9a xbx zl1al zl1fb zl2aw wfat rwx wsq

W. A. Bousfield, York St., Bellerive, Tasmania

w1ajt w1ajy w1amj w1anz w1erw w1rw w1ry w2abu w2ahz w2ait w2arb w2bda w2bjg w2ct w2dab w2jw w2qf w2ux w2tp w3aiz w3aur w3ja w3qv w4abw w4ft w5afb w5dyi w5ql w5ry w6asl w6awz w6bax w6can w6dnx w6dzm w6eqq w6fk w6qy w6vz w7qr w8az w8avp w8dsi w8zk w9aah w9beu w9dgz w9ef w9eta w9fbv w9fxj ac2ff ac3ma aa1kab bam ce1ah ce1av ct1aa d4abg d4an d4by d4uak d4uj d4yt ear21 f8alp f8da f8dmf f8do f8dot f8fr f8gdb f8gua f8ho f8ix f8jf f8olu f8rrr f8sm f8wb w8zx g2bm g2od g2sw g2xv g3bz g5by g5uq g5wp g5yx g6dh g6hp g6nt g6vp g6wy g6rb g6ut haf8b j3eh k1hr k1pw k1sc k1xa k4aan kfr5 oh2nad ok2by on4bz on4fe on4fp on4hp on4il on4ja on4jj on4us on4vq on4ww oz7t oz7y pb7w pk3bm sm6ua ti2hv un7ww uo1m ve1ar ve3aq ve4dj x9a x9b rwx wfa

Experimenters' Section

(*Continued from page 33*)

would be of great interest to many amateurs. Another thing — if you have an idea which you think ought to work, but which you haven't the time or facilities to try out, send it in anyhow — someone else may be in a position to try it, and it may turn out to be good. If you have a problem which you can't solve you will very often find that someone else has found a solution, so if you let us know about it we can often make mention of it and bring forth a lot of responses. In other words, look at the "X" Section as being a clearing house for ideas and helpful kinks, and remember that if you are interested in knowing what the other fellow is doing, he is probably just as much interested in hearing what you have done also. The only thing which can ever destroy the usefulness of this section will be lack of material and we have no doubt that the average ham has enough ingenious stunts to keep us going for years and years. Just how good we make it is up to all of us who are doing things and overcoming difficulties every day in the course of our radio life.

More Progress on 28 Megacycles

(*Continued from page 32*)

in the T & R Bulletin. We will present a few items of interest.

G2OD copied W9EF solid on February 2nd

QSO. K4AKV is helping out in off-frequency observation work on the 14-mc. band. K4KD received his "Sweepstakes Certificate" for work in the January contest. K4ACF reports from the sick bed. K4KD now offers reliable QSP to Haiti and Cuba through stations operated by naval operators in those countries.

Traffic: K4KD 884, K4DK 488, K4AAN 43, K4AKV 33, K4ACF 2.

FLORIDA — SCM, Harvey Chafin, W4AII-W4PAW — W4SK wins the state traffic banner this month with a total of 113. W4ACM, the Naval Reserve station is second. W4ACM and W4AII kept a schedule with the Yacht Haligonian, KGAW, during the races from St. Petersburg, Fla., to Havana, Cuba. Messages were exchanged every day and delivered to the crews' families, posting them on the race. W4MW is owner of the winning boat. W4MS was heard in Nicaragua. W4QA has been working a sked with a radiophone station in Chicago. W4QV has a FB fone set on the air. W4ADP, up at Crescent City, is applying for an ORS appointment. W4MM is a new prospect for an ORS appointment. W4AGR has a permit to use fone on 14 mc. W4AKA and W4JM are the only stations reporting from St. Petersburg. W4QL rebuilt his 852 transmitter and added a better power supply. W4AKH reports and also sends in a report for W4UJ. W4ALH, our newly appointed ORS and OBS, is getting out well. W4MF is using a very low power set on 7000 kc. W4JC is a new prospect for ORS, W4QN, that whispering saxophonist, reports. W4NB has been rebuilding. W4TK has been busy at WJAX. W4ABF has two UX210's perking. We are very glad to have W4TG's report again. W4UJ managed to let nine messages slip into his station. A new amateur radio club was organized this month. —The Gator Amateur Radio Club, W4GD, President; W4AAB, Secretary; W4MS, Treasurer. W4AGN is doing FB U.S.N.R.F. work. A real U.S.N.R. meeting was held in Tampa on April 26th. The speaker was Commander Wells from Orlando, who gave a brief summary of the Naval Reserve work. After his talk, a few questions were asked him and then the beans and coffee were served by Joyner, Martin and the SCM. W4AAB, the newest of the Gainesville stations, has a 210 going. W4WW is getting out pretty well with 201A's. W4ABL reports some DX lies. Hi. W4GD was QSO several foreigners. W4SD is rebuilding. W4IX and W4HX expect to have a station on the air very soon. W2BFH is moving to Tampa and is applying for an ORS appointment. W4OO is sending his OBS about twice a day. W4AO has been rebuilding. W4AGY and W4HY report. W4OZ is going on the air as a Naval Station and will keep the Thursday night skeds with the Naval net. The following are some of the amateurs at the P. A. Airways: W4BH, W4LO, W4NE, W4QV, W4ABG, W4ABA, W4AAO, W4SB, W4CR, W4PAA, W4GJ, W4NZ, W4AEO, W4AY, W4AF, W4BA, W4PI, W4GF, W9FNF, W1AMU, W6UA, W1YK, W8CTS, W5BNY, KFR6. Some of the PAA shop gang have been transferred to Brownsville on the Mexican division and are using the call W5BNY. The Miami Radio Club is picking up a bit despite the coming of summer. They gave a big blowout at W4AJD's house recently and about thirty were present.

Traffic: W4SK 113, W4ACM 102, W4MS 82, W4AII 79, W4QA 70, W4QV 60, W4ADP 57, W4MM 59, W4AI 50, W4AGR 34, W4AKA 30, W4QL 30, W4AKH 24, W4MF 76, W4JO 30, W4QN 12, W4NB 12, W4AEA 12, W4JM 9, W4UP 9, W4TK 10, W4ABF 9, W4TG 9, W4UJ 9, W4AAB 6, W4WW 6, W4OO 8, W4AO 8, W4AGY 2, W4OZ 1.

WEST GULF DIVISION

SOUTHERN TEXAS — SCM, Robert E. Franklin, W5OX — This will find us with some new Federal Radio Commission rules that we have long been in need of although quite a number of us have been practicing these rules already. It is hoped that everybody will put their shoulder to the wheel and make it a real pleasure to work on the air again by adhering to the new rules to the letter. W5AQY sends in a nice report as usual, but reports most of the bunch have spring fever. W5BKE is leaving Kerrville for Beaumont to attend the Radio School with a commercial ticket in view. W5BBY is to be congratulated on the way he has been handling the Schriener Institute traffic considering the fact that he is going to graduate on May 28th as Salutatorian of the Senior Class. FB. W5BKW has been getting out well. W5TD has been on a vacation in New Orleans. W5MS has been busy with the talkies this month. Quite a few of the hams have inquired about San Antonio's inactivity. How about it, OMs? W5JR has just had his shack rewired and promises to be back on the air real soon. W5BML is another new Houston ham. W5OX burned out his power transformer and will be off the air for a short time. W5AEA burned out a generator and is temporarily off the air pending repairs. W5IU has a new portable call, W5BOK. W5AE has one of the new Aero short-wave tuners. W5AFG kicked about my not printing Beaumont reports, but as yet I have never received a message report from there. Send them in, OM, we are always glad to have them.

Traffic: W5AQY 123, W5BKE 113, W5BBY 109, W5OX 23, W5TD 19, W5BKW 19, W5AJD 96, W5EI 62.

NORTHERN TEXAS — SCM, J. H. Robinson, W5BG — Well, fellows, this will be the last report from this SCM. It has been a pleasure to serve this section. W5WW challenges any ORS in Northern Texas in traffic handling. He reports DX good any time. W5RJ has a BCL op's license now. W5BAM is working in the daytime now so his skeds will have to be rearranged. W5HY has his set on the air again after the last move. W5ZY reports for the first time. We are surely glad to hear from you, OB, and hope you continue to report. W5AAE has been on the 170-meter band all winter. W5BG still keeps skeds with KFR6. The following stations have reported for the first time, but report no traffic: W5BEN at Amarillo reports for the following: W5WX, W5APB, W5VD, W5BEN, W5QE, W5ZH, W5BEI, SJ5BX, W5ALK. W5BEN has a 250 watt xtal set going now. W5BBH is going to apply for an ORS soon. W5DO at Jacksboro reports that he is looking for traffic and wants to know how and when to report. W5BBF is getting skeds lined up and intends to make the BPL next month. W5DF reports a scarcity of traffic up his way.

Traffic: W5WW 310, W5RJ 64, W5BAM 39, W5HY 16, W5BG 14, W5ZY 3.

OKLAHOMA — SCM, Wm. J. Gentry, W5GF — W5AUV has the high report of traffic this time. W5CB is second for the first time in ages. W5GF is busy with installation of electric refrigerators. W5APG is going good in the Naval Reserve. W5ALM is going to get back on the air very soon. W5QL is using fone and gets FB reports. W5DH has an OW op in order now. Tulsa is getting ready for the big Brass Pounder's meeting.

Traffic: W5AUV 54, W5CB 36, W5ALF 13, W5GF 7, W5AAV 2.

NEW MEXICO — SCM, Leavenworth Wheeler, Jr., W5AHI — W5AOD lays off for ten days and still makes the BPL easily on deliveries. That's three times straight. FB, says me. W5AJL accompanied the Clovis delegation to a musical convention in Las Vegas and, operating at W5ND, handled a lot of traffic to and from the delegates. While there, he and Dad and Bus of W5ND visited the SCM and put up a new pole. W5TV finds 3500 kc. OK for low power except for QRN. W5EF claims 14 watts on 14 mc. is better than 1 kw. on 7000 kc. W5AIE dropped in on the SCM again and says he's getting the traffic bug. W5BH is sorry now that he built a monitor — says ignorance was bliss. Hi. Most of the gang report very freaky conditions, strange skip effects, etc. Skeds have been all messed up by QSB at W5AHI and the bug is getting a rest. Possibly the solar eclipse due the latter part of April offers some explanation of the above.

Traffic: W5AOD 166, W5AHI 137, W5AJL 121, W5TV 40, W5EF 40, W5AIE 13, W5BH 9.

CANADA

MARITIME DIVISION

NOVA SCOTIA — Acting SCM, A. M. Crowell, VE1DQ — The boys seem to be concentrating on the 14-mc. band now. VE1AW and VE1GA have been testing on sked in the 3.5-mc. band. VE1BR has flocks of "W" stations calling him nightly on 14 mc. VE1AS just put through a "shady" deal with VE1CC whereby a UX210 changed hands. VE1DQ made two very nice contacts with ZL during the past month. Old timer VE1AR has reappeared with the usual kick and p.d.c. on 14 mc.

NEWFOUNDLAND — Acting SCM, E. V. Jerrett, VO8Z — VOQ is going to Northeast Greenland again this summer and is carrying a short-wave transmitter. More about that later. VO8AE will soon be eligible for WAC. VO8C works European countries consistently. VO8L has a new MOPA transmitter. VO8MC is rebuilding for high power. VO8AW built himself a new TPTG transmitter. VO8I has begun work in the 7000-kc. band and wants local QSOs. VO8A reports being heard in Austria on phone. VO8WG drove 180 miles on dog team and delivered some traffic. VO8Z took 39 messages from VO8WG at one sitting. Don't forget to try for VE QSO's Wednesday nights, boys.

Here is a chance for every Canadian to get a real kick. It has been suggested by the Publicity Manager of the T. & R. of the R.S.G.B. that each and every Canadian try to get a message of loyal greeting to their Patron H.R.H. the Prince of Wales. His birthday, as you all know, is on the 23rd of June. This year the 23rd falls on Monday which would enable the message to be received in England on Saturday or Sunday. Better still, as soon as you read this, write out your birthday message to the Prince and give it to the first British station you QSO. The T. & R. members will be on the watch for you and will be glad to QSP to destination. Let's put this over, fellows. We want greetings from every Province of the Dominion.

Summer is with us again — don't let dust collect. The 14-mc. band is at its best during the warm weather. Move your traffic on this frequency and get in on some of the good DX. Don't forget Canada Night every Wednesday evening at 11:00 p.m. E.S.T.

CANADIAN GENERAL MANAGER

ALEX REID, VE2BE

QUEBEC DIVISION

QUEBEC — SCM, Alphy L. Blais, VE2AC — With regret we record the passing of two amateurs, H. L. Robinson, VE2BC, killed in a plane crash, and J. McRobb, VE2AU, who died March 24th. Both were well known and esteemed by the amateurs of this division. VE2BE handled important traffic for the Byrd expedition stations WFA and WFBT. VE2BG has received his ORS ticket. VE2BB has been trying different antennas. VE2BD works DX and handles good traffic also. VE2BZ is working hard on 7 and 3.5 mc. to keep the messages rolling. VE2BJ has six operators with A. J. Cipriani as President. VE2AP will be on regularly after he gets his B. Sc. VE2BN, formerly of the Maritimes, does well and promises real work when his QRA question is solved. VE2AA is still going after DX on 14 mc. VE2CA gets his ORS ticket for the fine work done these last months. Mrs. VE2CA is better, and pounding the key as before. VE2HV is busy with the Company's many transmitters. VE2DN is using 'phone on 3550 kc. VE2AC got his Performance Certificate for the All-Section Sweepstakes Contest of January, 1930, scoring 950 points. I am glad to see how active this section is. Many skeds are kept faithfully, and we are confident that the All-Canada net will be a success some day. Our Canadian General Manager was in Hartford, May 2nd and 3rd, for the meeting of the A.R.R.L. Board of Directors. Don't forget the prizes for the best traffic totals for May to October.

Traffic: VE2AC 101, VE2BE 54, VE2BG 22, VE2BB 14, VE2BD 11, VE2BZ 8, VE2BJ 6, VE2CA 4, VE2BN 3, VE2AA 1.

ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE3FC — Central District: VE9AL again leads in traffic handled. VE3BC has contacted 1750 stations and handled 850 messages since October, 1927. VE3BP shows increased activity on 3600 kc. BP also reports two new arrivals on the air in VE3GK and VE3HE. Welcome, OMs. VE3DA reports another new station about to show its teeth in Belleville. VE3DW is still using his "flea-power" transmitter. VE3GM, the outstanding amateur 'phone station in Toronto, is showing the rest of the boys how it is done. VE3FC has been silent during the month. Eastern District: VE3XC descended to 14 mc. and worked a real list of DX. VE3XM is moving. Southern District: VE3HB and VE3FD are now devoting their time to CW DX operating, and to helping new hams get started. These new stations have been allotted the calls VE3GZ and VE3WM. Welcome, fellows. VE3CB has been moderately active, but reports conditions all the way from punk to rotten. Northern District: VE3HU is heading straight for an ORS appointment, with bigger and better totals. VE3DM also handles traffic. Move over, gang, and make room for VE3DM's brother-in-law, who has just been licensed as VE3HD. VE3AR has gone to Red Lake to operate CFJ, and will use his brother's portable set, VE3BH, from there. VE3BH will keep VE3AR on the air. VE3GD worked Spain on 14 mc. VE3CA has moved the outfit to a new shack. VE3AG is on regularly. VE3ET shot the works and will be off for a while. The Fort Williams Radio Club, with VE3GD as President and VE3FQ as Vice-President, is going strong with well over 200 members.

Traffic: VE3HU 26, VE3ET 10, VE3DM 8, VE9AL 43, VE3BC 18, VE3BP 11, VE3DA 9, VE3XC 2, VE3CB 4.

VANALTA DIVISION

ALBERTA — SCM, G. F. Barron, VE4EC — What is the matter, fellows? Your reports are as scarce as hens' teeth. VE4EI is our star station. Our prospective ham at Fort Saskatchewan expects his ticket soon. VE4AF is still experimenting with crystal. VE4HA handled an important message from Churchill in regard to some missing fliers. VE4DZ plans on busting the air with a portable. VE4GD made us a visit recently and VE4BV, VE4AF, VE4DZ and VE4EC took him for a tour of the city. VE4EC has rebuilt twice in the last month. VE4FJ is pushing his sigs out FB. VE4HM, VE4GT and VE4CU are on occasionally. VE4EA had his 28 mc. sigs reported in Ohio.

Traffic: VE4EI 53, VE4EC 3, VE4HA 1, VE4FJ 2, VE4EA 1.

BRITISH COLUMBIA — SCM, King Cavalsky, VE5AL — In Vancouver VE5AC manages to spear the odd message. VE5BM has xtal on 7000 kc. VE5BC has his new mast up. VE5CI is trying to get going again. VE5DR worked a K7 with a little old 201A. VE5FI blew his filter. Spring and golf have hit VE5AL. Victoria: The Victoria gang have been very active of late. VE5DU is getting xtal reports from the old slop jars. VE5CO puts R6 sigs to the Zls. VE5HR hasn't worked any DX yet. VE5EC is on regularly. VE5CJ gets on occasionally. VE5EK is having difficulty with his heap. VE5DQ and VE5HK are rushing the YLs. Prince Rupert: VE5GT has skeds with VE5FS, VE5BM and W6EIB. VE5DX is a newcomer. VE5CM has moved. VE5AR is migrating to Kamloops. VE5BR at Savary Island still sticks to the 3500-kc. band. We are very sorry to hear that VE5AW has been under an operation, and hope he will soon be back on the air.

Traffic: VE5AC 8, VE5BR 1, VE5AL 7, VE5DU 9, VE5EC 6, VE5CO 3.

PRAIRIE DIVISION

MANITOBA — SCM, A. V. Chase, VE4HR — VE4DJ is on very consistently. VE4IC heads the section in traffic. VE4GQ has returned to his old love, the Ultraudion. VE4DK has been QRL with U exams. VE4BU has been granted an ORS appointment. VE4EK and VE4FN have had their certificates cancelled on account of inactivity. VE4BQ has obtained a Belgian 75-watt bottle for his station.

Traffic: VE4IC 17, VE4DJ 9, VE4BU 8, VE4GQ 5, VE4HR 3.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — The approaching summer is getting its dirty work in already, as is shown by the few reports. VE4IH comes through with his usual nice total. VE4BB and VE4GR say that the weather has been very bad. VE4CV of Swift Current is disturbing the ether with a 210, on 7 and 14 mc.

Traffic: VE4IH 43, VE4BB 17.

Calls Heard

W1BUX–W1CMX, D. H. and J. Borden, Cherry St., Fall River, Mass.

ac1bd ce2ab ce3ab ce3ag ce3bf ce5aa ce7aa cm2jt cm2sh cm5by cm5cx cm8uf ct1aa ct1bx ct1by ct1ew ct2aa cx1af cx1fb cx1fc cx cwk d4aar d4abg d4xn ear10 ear18 ear21 ear37 ear59 ear65 ear98 ear116 ear125 ear136 ei2d ei8b f8aap f8aw f8axq f8btr f8bx f8cher f8cs f8da f8dh f8dmf f8dot f8ef f8eo f8er f8esp f8ex f8fem f8fg f8fk f8fr f8gdb f8gi f8gon f8hip f8hr f8kz f8lx f8oa f8olu f8pam f8pmg f8pns f8prw f8rb f8rko f8sm f8swa f8toy f8wb f8whg f8wkz f8wrg f8yy ff8oxo fm8cr fm8gkc fm8jo fm8rit fo9r freari49 g2ao g2az g2bm g2dt g2dz g2gf g2gm g2ip g2kf g2ma g2oa g2op g2ow g2un g5bd g5bj g5by g5bz g5is g5jo g5lw g5ml g5ms g5pj g5qa g5qv g5rs g5ak g5tz g5vm g5wk g5yg g5zn g6bd g6cl g6cr g6dw g6fd g6gc g6gs g6hp g6ia g6lk g6ivf g6nt g6ou g6pa g6qb g6rb g6vp g6wo g6wt g6wy g6xb g6xn g6xq g6yq g6za gi5hv gi5nj haf8b hafkx hc1fg hc1lc he2jc hc2jm k4akv k4dk k4kd k6boe lu1ba lu1bs lu1jf lu2aa lu2ca lu2dj lu3de lu3dh lu3fa lu3fk lu3hc lu3pa lu4bi lu4dq lu5ac lu5bz lu5dj lu6aj lu6fc lu7je lu8dj lu8dy lu8en lu9ee lu9dt nj2pa oa4j oa4l oa4q oa4r oa4z ob7nb ok2ny on4ar on4bc on4fe on4fp on4ft on4gn on4hc on4hp on4jj on4jk on4ka on4my on4pj on4ro on4rs on4us on4vm on4wm oz7t oz7y pa4dw pa4flx pa4fp pa4qf pa4xg pk2aj pk3bm pylaa pylah pylaw pylbr pylcl pylcm pylcr pylfb pylia py2ad py2ay py2ba py2bg py2bk py2bm py2ic py2ig py2ih py2ii py2ik py2qb py2sb py3aq py3la py8ia sm6ua ve5aw vk2dy vk2ek vk2hc vk2hu vk2js vk2nb vk2rx vk3cx vk3dc vk3go vk3hk vk3lp vk3mo vk3pm vk3wo vk3xo vk4jh vk4rj vk5gt vk5it vk5bg vk5wr vk7dx vo8mc vo8s vq2bh vu2dr vu2rx x2x x9a z1lan z1lfc z1lfw z2ac z2gh z3aj zs1p zs2n zs2s zs4a zs4e zs4m zs4t zs5u zt1j zt1n zt1r zt1x zt5r zt5s zu1d zu5b zu6n zu6s zu6w qq1a fgs ctbj xearn xeft xc xos7aw wfa wfat

W3WG, Eugene B. DeTruck, aboard the S.S. "Angeles"

Between Bermuda and the Equator 7000-kc. band

w1abc w1ach w1adj w1afc w1afw w1aje w1ajk w1ajx w1amd w1bdi w1bes w1bet w1bgi w1bil w1bjl w1bnl w1bxl w1caa w1cdg w1cjd w1cpi w1cpt w1dz w1er w1fk w1gw w1id w1if w1lk w1mk w1nx w1og w1rv w1sz w1wl w2abe w2adc w2adl w2afw w2aii w2aiq w2ajp w2alu w2ane w2anx w2apk w2ard w2aru w2ase w2aun w2avm w2avo w2aws w2axk w2ayj w2azy w2bbq w2bds w2beq w2bfl w2bha w2bhr w2bkq w2bm w2bne w2boc w2bpg w2bpg w2brm w2bry w2bsc w2baw w2buq w2bve w2bvi w2bvk w2bwe w2bx w2bxj w2bxn w2bxw w2bxb w2caf w2cny w2cjt w2cuq w2cxl w2de w2dk w2fm w2fo w2ft w2hs w2jl w2kr w2ku w2le w2mq w2nl w2qf w2sc w2uf w2wz w2xam w2xb w3aeq w3aff w3aho w3aic w3ajt w3amg w3aog w3apf w3aru w3asg w3aup w3aus w3awm w3aws w3bkt w3bm w3bpi w3di w3ed w3hx w3hz w3la w3lu w3nk w3pc w3pq w3sb w3uh w4aci w4aef w4aft w4afw w4agr w4agw w4ahq w4ai w4aim w4aka w4ake w4akg w4akt w4akw w4alr w4arp w4ax w4cg w4fx w4gk w4gw w4hb w4hd w4hk w4hu w4jo w4kp w4lj w4lx w4mm w4nb w4oo w4pp w4sq w4sx w4uy w4vs w4vz w4wt w4wz w4zn w4zt w5aao w5ach w5ady w5aea w5agn w5akp w5ana w5aqk w5arg w5atm w5aux w5aza w5bam w5bek w5bg w5bhy w5bq w5cb w5cf w5eb w5fa w5fb w5fp w5iv w5jc w5jd w5mm w5no w5td w5ww w6ami w6amw w6axe w6axm w6bam w6bbk w6bh w6bkk w6bky w6bnc w6boq w6bqf w6bqq w6bqz w6btd w6btw w6bvs w6byb w6cbp w6cis w6ctk w6ctz w6czc w6dcg w6dep w6dli w6dpj w6dpo w6dui w6dwi w6dzy w6edg w6edo w6eeb w6ehi w6eiz w6ejc w6ejh w6ejk w6eke w6ena w6eou w6esp w6ew w6fc w6jn w6qt w6sf w6xbb w6xd w7aax w7afl w7ah w7aht w7aiz w7qf w8adu w8aed w8aes w8ait w8ajn w8ald w8amb w8anh w8aqx w8arl w8bax w8bef w8bcj w8bdv w8bed w8bfs w8bgt w8bgx w8bid w8bih w8bjo w8bly w8bm w8bno w8bnt w8bof w8bqp w8brb w8bti w8bv w8can w8cau w8ces w8cew w8cft w8cfw w8chq w8cas w8cut w8cxv w8cyw w8dan w8dbs w8ddg w8dev w8dgt w8dhu w8dii w8dlg w8dma w8do w8drt w8dwm w8ft w8gz w8js w8kc w8kd w8ll w8lt w8nr w8oj w8ss w8wa w8wk w8ww w8yb w9acg w9acl w9ada w9aib w9aj w9ajo w9ajz w9akv w9akz w9amr w9ams w9amv w9aqh w9aqu w9aku w9auh w9aum w9axv w9axs w9azw w9bba w9bcs w9bdh w9ben w9bhh w9bhi w9bhw w9bly w9bmr w9bmw w9bnf w9bns w9box w9bqe w9btl w9bwk w9bwx w9cd w9cdh w9ceb w9cfa w9cfl w9cgh w9cjb w9ckz w9cnf w9cps w9cpy w9dbj w9dck w9ddo w9dfh w9dfs w9dft w9dga w9dgz w9dib w9dnh w9dol w9dti w9dwa w9dyb w9eaj w9ecz w9egu w9egx w9eiz w9elj w9ell w9exa w9ext w9fts w9ftt w9ftz w9fyp w9gau w9gdh w9ggb w9ggh w9ggq w9gix w9gjs w9jq w9kd w9nr w9lf cm2jm cm5fc cm5fl cm7sh cm8uf cm8yb ct1cx cx7 ear9l f8dh f8fem f8hcl f8pam f8ror g5by g5ml haf4c he1fc he1lc k4kd k6ewb nn7c on4bc on4dj on4hm velam ve2ac ve2be ve2bp ve3bc ve3cz ve3dd ve3ll ve4gi zl1fc zl4xc jk w1adw w1ae w1aep w1afa w1ajd w1ajl w1akd w1ala w1asf w1axv w1aze w1bak w1bln w1caw w1cmx w1da w1dp w1jy w1kn w1lq w1og w1om w1pf w1qv w1ry w1tl w1uc w1vz w1we w1za w1zz w2aeb w2aes w2aib w2alp w2alv w2amm w2amr w2arh w2ary w2asc w2bda w2bec w2ben w2biw w2bjg w2bsf w2byr w2cjx w2el w2fp w2gj w2hj w2hq w2jc w2ov w2qn w2qp w2uk w2va w3aaz w3aiu w3aiz w3ajd w3aqi w3auo w3awn w3dh w3jr w3mc w3qw w4aay w4abr w4aef w4akt w4aq w4aqi w4cc w4fm w4fz w4mf w4ql w4tn w4we w5aee w5agg w5aom w5td w6aux w6bax w6kg w8aau w8adm w8aed w8arf w8aun w8axa w8axn w8bbl w8bcm w8bjv w8bkp w8brh w8bvw w8cp w8djv w8dnu w8dui w8dwm w8dwv w8gs w8hx w8pl w8ss w8su w9ark w9cxw w9def w9eaj w9ecz w9ef w9ell w9enr w9eve w9exw w9faz w9ftz w9giy cx7af ear96 f8axq f8blg f8er f8fr f8tsn fm8smu g6vp g6za haf3c k4dk kfr6 lu2ea lu2dw lu3de lu3pa lu6aj lu8dy lu9dt nj2pa oa4j on4go oz5a py1aa py1aw py1cl py1cm py2ax py2ig py2ih py2ba py2bf qq1a ve2bm ve2ca ve3cm ve3eo ve3qs ve3zz vk4rb vo8mc x9a z1lan z12ac z13cm z14ax zt6r zu6b zy6n

7,000-kc. band

Equator to Santos, Brazil.

w1afd w1anp w1asf w1axx w1mk w1mo w1qv w1rp w1rv w1sz w1ab w2afr w2alu w2als w2amr w2apd w2awq w2axn w2bjo w2bng w2bqf w2bwx w2cxl w2fm w2nl w2qf w2uf w2wr w3adp w3adz w3aig w3asg w3aws w3ba w3bg w3bkt w3pf w4ahh w4ahl w4ahr w4aka w4alg w4aq w4ec w4ft w4gj w4hb w4pp w4pz w4vv w4we w5ae w5ana w6aaz w6bjb w6caf w6car w6cii w6tm w6yx w8aam w8aat w8adp w8alu w8axz w8ayh w8bif w8bls w8bno w8boo w8bps w8bqu w8bwi w8bwu w8cjt w8css w8cum w8cux w8dkt w8jm w8rj w8vx w8wi w9amk w9ayd w9azy w9bcs w9bkz w9bly w9bsq w9cbj w9cja w9cjb w9cjn w9cms w9cvn w9dgz w9ebo w9ecz w9ehi w9eji w9eve w9ezb w9gdv w9ghw w9hd w9am w9um w9yc cm8yb ear96 on4dj ve3cz

(*Continued on page 60*)

Correspondence

The Publishers of QST assume no responsibility for statements made herein by correspondents.

All-American Mohawk Malaysian Expedition

Base Camp, Poeroek-Tjahoe

Editor, *QST:*

Although Mr. Harry W. Wells (W3ZD, Chevy Chase, Md.), radio operator with the Expedition, has from time to time reported to the League through *QST* of the radio activities of the Expedition in Borneo, I wish to take this opportunity before we leave for the coast and PMZ is dismantled, to thank the American Radio Relay League for the splendid coöperation we have received in keeping up communication with the United States through members at home and abroad.

Sergeant Paul Holbrook, KA1AF, Ft. Mills, P. I.; Commander S. M. Mathes, KA1CY, Manila, P. I.; L. R. Potter, W6AKW, Lancaster, Calif., and Colonel Clair Foster, W6HM, Carmel, Calif., are the operators, Mr. Wells informs me, who gave him such generous support.

You have very likely heard by this time of the splendid service PMZ was able to render the government of the Dutch East Indies at the time of the assassination here of the military post commandant, Captain J. C. DeQuant, and the subsequent disturbance. Mr. Wells, through Station KA1AF and KA1CY was able to notify the garrison at Bandjermasin of the tragedy, and has since been handling all official reports regarding political consequences, etc., for the isolated post. There is a feeling here now that through this incident, made possible by the A.R.R.L., the Dutch colonial government will elevate the status of amateur radio operators in these great islands and license them just as our own government does members of the League. If this comes about we shall feel mighty proud, and I personally shall bring the matter to the attention of the Governor-General at the first opportunity.

— *Theodore Seelmann*

Pertinent Comment from Overseas

13 Seagry Road, London, E. 11

Editor, *QST:*

Your editorial in March *QST* hits the nail right on the head. To listen to the average W ham, one would hardly realize that such an excellent series of articles on modern station equipment had been so ably written by Mr. Hull.

It must be a great disappointment to the A.R.R.L. executives, as sponsors of Mr. Hull's work, to know that after twelve months' working under the new conditions, the position is so little changed.

Considering how easy it is to obtain a pure d.c. note, it really is surprising that a good 75% of the U. S. A. stations received on this side still sound like the proverbial band-saw.

With regard to "off-wave" working, only one British amateur to my knowledge has been heard by the authorities working outside the "band," and he found himself a B.C.L. again within twenty-four hours of the offense. This will show you the position in England.

Wishing *QST* every success.

— *Lawrence C. Fuller, G6LB*

The Far-Reaching Ham Spirit

Houlton, Maine

Editor, *QST:*

Last June I had the misfortune of being the victim of an auto accident which left me with a broken back. Up until a few weeks ago I have been confined to the house, enclosed in a cast, which made it impossible for me to do anything which required the least effort on my part.

It is during moments of trial and hardship that one appreciates the kindness and friendship of those about him. So through the medium of *QST*, I want to extend my sincere thanks and appreciation to all of my fellow hams who have been so kind and generous to me during my illness.

The fine spirit of fellowship extended by all those with whom I had the pleasure to work certainly helped very much in passing away what would have been many a long, lonesome hour. In all districts worked, especially the first and second, I found every ham a real sport, ever willing to do some little thing to make life more pleasant for me. The gang here at Houlton also stood by me in my trouble. The unseen amateur friend is certainly one of sterling worth.

73 from a very grateful fellow ham.

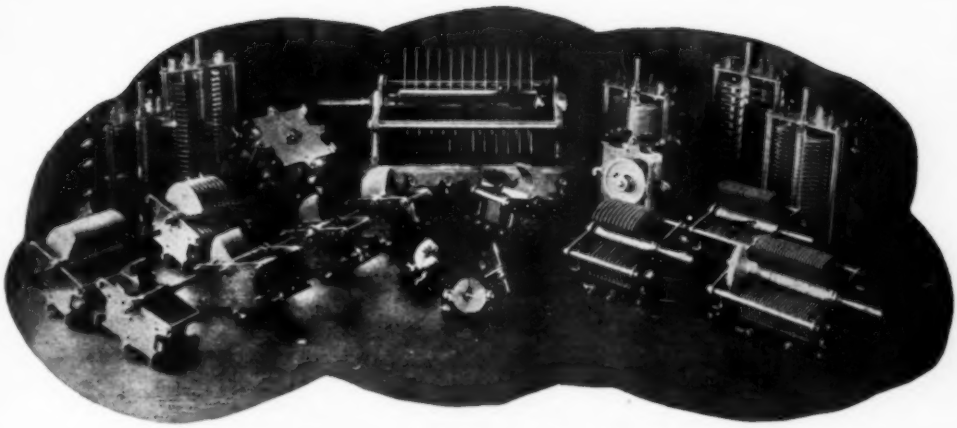
— *Phillip Clark, W1BKN*

Constructive Work on 'Phone

Olathe, Kans.

Editor, *QST:*

In response to a request published in *QST* for 1750-kc. stations to send code lessons, I volun-



More than a score of different Cardwell Condensers were used in equipping the Byrd Antarctic Expedition

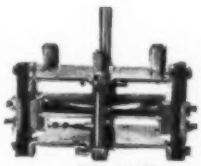
Be Right The First Time!

GUESSING may prove successful occasionally, but in the long run reliance on past performance proves the wisest course.

The Byrd Antarctic Expedition, now successfully concluded, used 25 different types of Cardwell condensers. The success attained in maintaining Radio Communication with home and between isolated units of the Expedition is well known, and no comment on our part can add to the glory of these achievements.

Cardwell condensers have always proved worthy of the confidence of winners and are worthy of *your* confidence. If you are in need of condensers you can play a sure thing and eliminate doubt—use Cardwells.

Send direct if your dealer does not stock. Literature sent on request.



The 201E

A 2 plate variable condenser having the stator plate readily adjustable to permit changes in maximum capacity ranging from 50 to 10 mmfds, with a constant minimum of 7 mmfds.

CARDWELL CONDENSERS

THE ALLEN D. CARDWELL MFG. CORP.
81 Prospect Street, Brooklyn, N. Y.

Since broadcasting began

"THE STANDARD OF COMPARISON"

Cunningham
RADIO TUBES

Name Integrity

is important in your
tube selection

For your mark of recognition, we have reproduced the characteristics that identify genuine CUNNINGHAMS.

Visible proof of in-built quality

E. T. CUNNINGHAM, INC.

New York Chicago San Francisco
Dallas Atlanta

teered. During October and the first part of November I, with the help of my sister, W9UA, sent 34 lessons, missing but one night, when lightning became so bad as to burn out the line telephone here. We conducted the lessons one-half hour in length, starting each one with alphabet review, then following with sentences sent slowly, and the last 10 minutes running the omnigraph. About 10 minutes divided into several periods was taken up by explanation and answering of cards and letters. At the conclusion reports were asked with promise of sending a card when I came on the air again. About 50 reports were received.

During November and December I built a new crystal controlled transmitter following many suggestions published in *QST*. The set uses two Type '52's as power amplifiers, modulated by two 845's.

With this transmitter completed I came on the air Christmas and up until March 1st sent 50 lessons of an average of one hour in length. The new transmitter practically eliminated BCL interference so I ran it from 7:30 to 8:30 p.m. and sometimes later. The lessons were conducted on same lines as before, by starting each with the alphabet, following with slowly sent sentences taken from the Handbook, then running the omnigraph from 7 words upward to about 15 words per minute.

Reports soon began to come in from far and wide; 39 states, Canada and Mexico have been heard from. The set reached out consistently 1000 miles in every direction and 50 per cent of the time, 1500 miles. Many have claimed 15 words per minute speed gained, while dozens have applied for licenses or appeared before inspectors. Others have not yet received action on examinations or applications. Besides these there were a great many operating on provisional licenses, capable of doing only about 6 words, who listened and gained up to 12–15 and more.

I write this to let you know that I have kept the schedules in spite of the fact that my sister, on whom I depended for help when I agreed to send, has been sick since December.

Anyone securing 25 or 30 of these lessons gained speed enough to read calls and make the grade for examination as proven from reports. I have sent each Friday and Saturday since March 1st just to give several of the last fellows getting on a little boost. Now agree with me that no 7- or 14-mc. man has done more to help out the hundreds of fellows who want a little lift getting started, or tell me who he is and how he did it and I'll go his method one better next winter.

Keep the good work up at Headquarters.

— *Marshall H. Ensor, W9BSP–W9UA*

Office Supervisor of Radio,
2116 L. S. Smith Bldg., Seattle, Wash.

My dear Mr. Warner:

Believing that you may be interested in some of the amateur inquiries reaching this office, I am forwarding the enclosed letter, dated March 25, 1930.

— *Edwin W. Lovejoy, U. S. Supervisor of Radio, Seventh Radio District*

SPRAGUE
Electrolytic and Paper Condensers
RMA Show
Auditorium—Booth D-50
Atlantic City
JUNE 2nd to 6th

The "Little GIANT"

Capacity
8MFD
Peak Voltage
430 DC
Can Negative

$2.50

HERE'S the real "surprise package" of the radio industry. The new, perfected Sprague electrolytic condenser — with the exclusive one-piece, rolled-edge anode — concentrating 8 MFD capacity into a space of only 1⅜" diameter and 5" long.

Individual socket mounting makes it instantly adaptable to any circuit. Protected vent integral with top prevents all liquid leakage. And because there isn't a soldered or welded joint anywhere — the Sprague gives you in practical performance the maximum of efficiency.

It has the endorsement of the leading "hams" for transmitting use (names on request). Write for information of special interest to "hams."

SPRAGUE SPECIALTIES CO.

Offices & Laboratories: **Quincy, Mass.**
Factories: **North Adams, Mass.**

SPRAGUE
Electrolytic CONDENSER

it would be

FATAL

to lose

Control

Barbed wire – trenches – dug-outs – a field set and a thin strand of wire. The difference between control and lack of control may spell life or death to an entire brigade. It's a far cry from No Man's Land to the comforts of your home.

But even in your radio set . . . control plays a vital part . . . and it has been the privilege of Centralab to furnish the volume controls of millions of radio receivers.

Is your radio — Centralab equipped?

Write Dept. 320-F for Free Booklet, "Volume Control, Voltage Control and Their Uses"

Centralab

Central Radio Laboratories

Dept. 320 F, Keefe Ave., and Humboldt

MILWAUKEE, WIS.

TRANSMITTING and RECEIVING PARTS and TUBES . . .

Biggest Discounts to Amateurs

Every make of AC and DC parts, kits, accessories, and cabinets of merit always in stock . . . 12 brands of tubes.

Free Technical Information and Advice by Experts.

Buy in Seattle at Chicago and New York Prices

WEDEL COMPANY

SEATTLE, WASH.

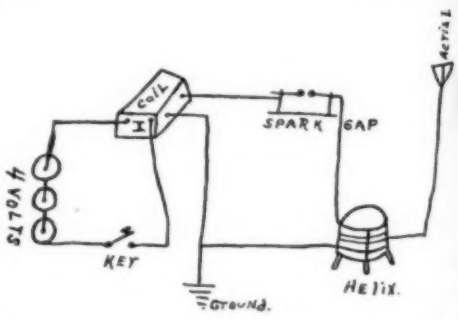
RADIO and ELECTRICAL JOBBERS

SINCE 1888

Federal Radio Supervisor:

Dear Sir:

Am enclosing a diagram of spark transmitter.



Is a license required to operate such a set and is it unlawful to operate such a set within the state?

Would you please send me a complete set of rules governing radio communications?

Thanking you in advance.

A Suggestion

Detroit, Mich.

Editor, *QST:*

I have just read with interest the letter by Charles Manley of Summit, N. J., with reference to rag-chewing. In this connection it occurs to me that it is about time *QST* did something to bring together those amateurs who are not primarily interested in traffic. I think this everlasting "QRU C U later," coming as it usually does immediately after two stations have made contact, is the main reason why so many amateurs have turned to radiophone for a change.

Personally I am most interested in experimental work and have been devoting a considerable portion of my spare time during the past twelve months to aircraft radiophone communication experiments. This leaves me comparatively little time for ham work, and while I am always glad to accept an important message for relay or delivery, I do not feel that I must accept the unimportant messages which take up most of the time of our traffic stations. Granting that traffic work is excellent training for any operator, it cannot be indulged in consistently except by operators who can keep regular schedules and be on the air for a reasonable time at least every other day.

My amateur interest is about equally divided between telegraph and telephone but I think probably I get the most enjoyment out of a good rag-chew or exchange of interesting information. I also like to hook up with other amateurs who are willing to check transmission tests and who are competent to give an accurate report. During the past twelve months, however, I have not QSO'd more than fifty amateurs of this type and 75% of them have been working in the 14,000-kc. band.

In the past it has been suggested that a special

A New Line Of Transformers

Again ACME leads in transmitting apparatus

Here's a brand new line of transformers and chokes for transmitting stations. Back in 1920 when C. W. power began, Acme was the first to have the transformers ready for the tubes. Again Acme pioneers in transmitting apparatus, this time with a line developed after years of experience and by studying the needs of the amateur and the transmitting station.

Note the construction of this new line and some of the features exclusive to Acme. There's the porcelain insulators on the high tension terminals; there's the strong metal case in which the transformers and chokes are submerged in insulating compound.

All these transformers and choke coils are insulated to (and tested at) 5000 R. M. S. (7000 peak) between all high voltage windings and ground. No more worry about the power supply failing just when you have an important message.

Send for Bulletins 110 and 111 and learn all about this new line. You'll want to have this information on hand when you get ready to improve your station. Just fill in the coupon below and mail it to the Acme Apparatus Corporation, Cambridge, Mass

ACME
~ for transmission

ACME APPARATUS CORP.
Cambridge, Mass.

Gentlemen: Please send me a copy of Bulletin 110–111. Dept. Q-1

Name .....
Address .....
City ..... *State* .....

Can you turn back the pages of time?

If you have the 1920 series of *QST* — and probably you have not — you are one of the few. Even 1922 and 1923 copies are getting scarce. And copies before the war! Well, let's change the subject.

A few years from now *QST* copies of to-day no doubt will be just as scarce. Every reader of *QST* appreciates its reference value. We are daily reminded of this fact by the many requests we get for back copies, many of which we cannot supply.

Next year — or probably later this year — you will be looking for a certain 1930 issue of *QST*. You had better resolve right now to keep your copies in a

QST Binder

Note the wire fasteners. Unnecessary to mutilate copies. Opens and lies flat in any position.

One-fifty each postpaid

A binder will keep your *QST*s always together and protect them for future use. And it's a good-looking binder, too.

QST

1711 Park St., Hartford, Conn.

general call be assigned to experimenters or rag-chewers and I strongly second this suggestion.

— *C. H. Vincent, W8RD–W8XB.*

Hi!

735 Purdy St., Birmingham, Mich.

Editor, *QST:*

You might tell me, if you can, whether the last vestiges of our famous and virulent fever ever leave the veins of an erstwhile victim. For lo, I had thought the persistent bug completely gone, but his devious ways surpass the understanding of man, selah! Yesterday I came across *QST* in the library, and turned its familiar but strangely different pages. Therein I came across Reddington's picture of a station of by-gone days. My eyes felt slightly misty and my throat a little tight.

A few years ago I was one of the regulars and although always more of an experimenter than operator, the love of the hobby is about the same, as you know, in both. Putting myself through college and working at the same time has taken all of my energy for the past four years. But it's all over now, and I'm a full-fledged liar — I mean lawyer.

The other night, however, I must needs tear the broadcast receiver to pieces, and put it together again. There's something infectious about the feel of a soldering iron, and the smell of burning resin.

Oh well! Send me that Handbook. I've gotta see where things stand.

— *John C. L. Cowen, Ex-8BYR.*

The Off-Frequency Problem

Dryden, N. Y.

Editor, *QST:*

For the past few years *QST* has been stressing the perils of off-band operation of amateur transmitters. This has been especially true during the last year, since off-frequency operation has become an international crime. This has been a good thing and been heeded by those who possess anywhere near the normal intelligence.

However, recent developments seem to indicate that there are a few in this amateur radio game who do not seem to be able to comprehend the magnitude of the offense of off-frequency operation. These few should realize that someone is going to get hurt — hurt bad. The worst of it is that the innocent will have to suffer with the guilty if this situation continues. These people who continue to operate out of their proper channels should realize that they are almost sure to be causing interference with very costly services. Those who operate transatlantic stations are losing money when their operation is interrupted. I am told that it costs about five thousand dollars an hour for each hour these stations are caused to stand by.

Now this brings us to the question: what will be done about it, who will do it, and what can the amateurs in general do about it? In the first place the government will have to take drastic

RCA

RADIOTRON
UV — 849

MODULATOR, AMPLIFIER *or* OSCILLATOR

AMATEURS who operate phone transmitters of medium power will find that Radiotron UV-849 is a very effective modulator. Its characteristics have been so designed as to make it particularly suited for use with oscillators operating at plate voltages of from 2000 to 3000 volts. The high quality of phone transmission obtainable through its use will gratify the most exacting amateur.

Then too, Radiotron UV-849 will give remarkably smooth and stable performance when used either as an oscillator or as a radio frequency amplifier at frequencies below 3000 kilocycles (wave-lengths above 100 meters).

Filament Volts 11 Filament Amperes 5 Amplification Factor 19

Modulator		
Plate Volts	2000	3000 Max.
Grid Bias Volts	-87	-132
Plate Current (ma.)	60	100
Plate Resistance (ohms)	4000	3200
Plate Dissipation (watts)	300	Max.
Oscillator Input Watts for each UV-849 (Mod. Factor 0.7)	110	350

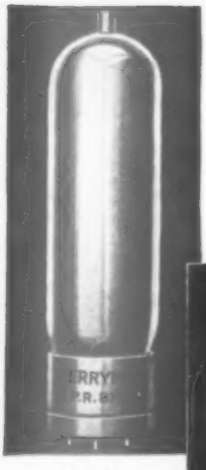
Oscillator and RF Power Amplifier	
Max. Operating Plate Voltage	
Modulated DC Plate Volts	2000
Non-modulated DC Plate Volts	2500
Max. DC Plate Current (ma.)	350
Max. Plate Dissipation (watts)	400
Power Output (watts)	350

ENGINEERING PRODUCTS DIVISION

RCA VICTOR COMPANY, INC.

233 Broadway, New York, N. Y.

Representatives in Principal Cities



FOR PURE D.C. POWER SUPPLY

P. R. 872

Fil. Volts - - 5
Fil. Amps. - - 10
Peak Inverse Volts - - 5,000
Peak Plate Amps. - - 2.5
Voltage Drop - 15
Overall Length - 8½"
Overall Diam. 2-5/16"
Price - - $18.00

P. R. 866

Fil. Volts - 2.5
Fil. Amps. - 5
Peak Inverse Volts - 5,000
Peak Plate Amps. - 0.6
Voltage Drop - - - 15
Overall Length 6½"
Overall Diam. 2⅜"
Price - - $8.00

UNDER the new regulations all amateurs must use an adequately filtered D. C. current supply.

P. R. 866 and P. R. 872, both mercury vapor rectifiers, besides emitting a wave form easy to filter, furnish a stable source of plate voltage—full load or no load, because both tubes possess a low and practically constant voltage drop. The unusually long life of the P. R. 866 and P. R. 872 is due to the low operating temperature of the oxide coated filament combined with the extremely low voltage drop resulting from their mercury content.

Use these Perryman rectifiers, famous for their rugged strength, in bringing your station in line with the new regulations.

Attractive prices for licensed amateurs

PERRYMAN ELECTRIC CO., Inc.,
4901 Hudson Blvd., North Bergen, N. J.

Enclosed please find money order / check for $.....for
..... P. R. 872 at $18.00. ..... P. R. 866 at $8.00.

Name.....Station.....
Street.....
City.....State.....

action, for this sort of thing cannot be allowed to go on. Amateurs must realize right now that something has got to be done — and done quickly. It must be realized that the surest way for the government to correct the problem is to prohibit amateur radio entirely. This puts the problem in the hands of the amateur to correct his own problems, and at once, if he is to continue to exist.

The air will have to be policed, and by the amateurs themselves. I would like to suggest that a number of amateurs, who possess the necessary frequency meters to determine the limits of the bands, be appointed by the A.R.R.L. to act as police of the amateurs, in much the same manner as the Official Broadcasting Stations are appointed.* These stations could notify the offending stations and also the Radio Inspectors. I am sure that if this were done, and the amateurs knew that they were being watched and reported, there would be very little off-frequency operation.

Let me say that in all fairness to the conscientious amateur, something has got to be done about these outlaws. Amateurs should remember that it is the duty, according to law, of each and every one to report any of these violators that they chance to hear. If they do not they themselves are equally guilty with the offender. This business is a serious thing — let us get under way right now and somehow, someway do away with this off-frequency business.

— *John T. McWatters, W8CBK.*

* The A.R.R.L. Official Observers, two or more in each Section, do just this work, their reports being coördinated at Headquarters so that necessary action may be taken against persistent and flagrant offenders who jeopardize amateur privileges. — EDITOR.

Calls Heard

(*Continued from page 51*)

14,000-kc. band

w1asf w1ava w1bbe w1bil w1bl w1cek w1cow w1da w2adp w2ajj w2amm w2aow w2bbc w2bia w2byr w2cxl w2dta w2ff w2ja w2ov w2rs w3aiz w3dh w4we w8ced w8lo w8sz w9bef w9def w9dhp w9dgz w9eap w9wt ce3ci ct7aa cx7ac f8ex f8fem f8swa g2gm g5by g5ml g5wt g6wt lu1bz lu2dj lu2fi lu3fa lu7je lu8dj lu8dy oa4q on4bt on4hj on4jj pylh pyicd py1cr py2ad py2ak py2ay py2az py2ll py2ik py3ak py3aq py8ia ve2bd zs4m cxcwk

W6EQO-W6BBY, F. C. Thompson, 155 N. Canyon Blvd., Monovia, Calif.

1759-kc. 'phone

w9byq w5kq w9bfx w5bky w9xv w9dky w9bfy

W2AJP, Norman B. Krim, 227 Haven Ave., New York City, N. Y.

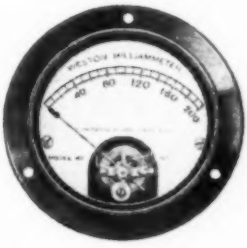
cm1by cm2xa cm8le cm8uf cmh2 cmz51 ct1bd ct1cp ct1kg d4nez ear52 ear113 f8dz he1fg he1le k4kd k5dd k6eb ok1na on4uy vk2hk vk4hu vk2ns vk3bq vk3ga vk3jk vk4bh vk4do vk5it vk7ch zl1bn

Elliott C. Hagar, 30 Adams Ave., West Newton, Mass.

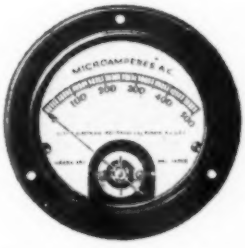
14,000-kc. band

ce1ah ce3ag cm5fl cm8ux w6ekw w7jc cm8yb ct1na ct1ng ct1by ct1cw cx1af cx7 d4rh ear21 ear96 ear98 ei2d es8 f8aw f8dmf f8er f8gyn f8hr f8kz f8lgb f8gyn f8hr f8ir f8lgb f8sm fm8cr fm8gkc g2fs g2ip g2oq g5by g5bz g5ml

Model 301 Voltmeter with 2500 or 3000 Volt Scales.



Model 301 Milliammeter 100, 200 or 500 M.A. Scales.



Model 301 Rectifier Meter for measuring A.C. in plate supply — 500 Microampere A.C. Scale.

Be prepared to meet the NEW REGULATIONS

ONE of the new regulations which the Federal Radio Commission has recently adopted with reference to the amateur is that he must keep an accurate station log showing, among other things, the input power to the last amplifier stage in the case of a multi-tube transmitter, or the watts input to a self-excited oscillator.

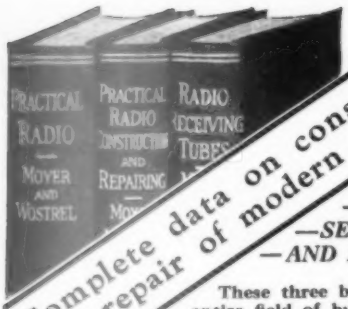
The new regulations also state that the amateur must use "an adequately filtered direct current power supply or its equivalent."

These regulations now in effect require that the amateur should be able to properly adjust his equipment to conform with them. But before the amateur can do so he must be provided with meters of suitable characteristics and proper ranges for accurately indicating the voltages being applied to his tubes and the current he is drawing from them.

For this service Weston offers three new instruments of the famous Model 301 design equipped with Bakelite cases — shown in the illustrations. For complete descriptions and instructions in the use of these meters write to the factory direct, addressing your inquiry to the Radio Engineering Department.

Weston
PIONEERS SINCE 1888
INSTRUMENTS

Weston Electrical Instrument Corporation **602 Frelinghuysen Ave., Newark, N. J.**



Complete data on construction and repair of modern radio sets

—for
—DEALERS,
—SERVICEMEN,
—AND AMATEURS

These three books cover the entire field of building, repairing and "trouble-shooting" on modern broadcast receiving sets. The Library has been brought right up-to-the-minute in every respect, including the very latest developments in the design and manufacture of equipment. The recent interest in short wave reception is reflected in a section which deals with the construction of this type of receiver.

THE RADIO CONSTRUCTION LIBRARY

Three Volumes, 6 x 9, 993 pages, 561 illustrations

THESE three books embody not only a thorough home-study course, but a ready means of reference for the more experienced radiotrician. Step-by-step information is given on wiring, "trouble-shooting," installation and servicing to get the best tone quality, distance and selectivity in broadcast reception from all types of sets.

Data is given on equipment, such as loudspeakers, antenna systems, battery eliminators, chargers, vacuum tubes, etc. The text is profusely illustrated throughout.

NO MONEY DOWN — SEE THESE BOOKS FREE
Simply clip and mail this coupon

McGRAW-HILL FREE EXAMINATION COUPON

McGraw-Hill Book Company, Inc.
370 Seventh Avenue, New York

You may send me the **Radio Construction Library**, three volumes, for 10 days' free examination. I agree to remit an initial payment of $1.50 at the end of 10 days and $2.00 a month until the price of $7.50 is paid — *or* — I will return the books at the end of ten days.

Name.....

Home Address.....

City and State.....

Position.....

Name of Company.....*QST*-6-30

Balkite

Chargers · Eliminators
Radios

PARTS AND SERVICE

ELECTROLYTE

WRITE FOR INSTRUCTIONS

A. F. MARTHENS COMPANY
Factory Representatives
Tel. Cortlandt 4489 54 Dey Street, New York

g6vp g6wo g6yt haf8b he1fg he2jc he2jm haf8b k4kd k6ewb laig laih lu3fa lu3pa lu5ac lu9dt nj2pa nn1nic oa4j oa4l oa4q oa4r on4fp on4ft on4gn on4hp on4jk on4my on4vu os7y pa0qf py1aa py1aw py2ik py2as py2bg ve5ao ve5aw vo8ae vo8aw vo8mc xig xwim zl1ao zl2bx zl4ao zs4e zu6n

ex-W3AVJ, J. G. Houck, 319 Walnut St., Pottstown, Pa.

14,000-kc. band

g2gm g5by g5ml g6rb g6ut f8ex f8fg f8he fm8rit on4jj on4hp on4ro ear10 ear37 ear96 ear98 d2cc d4rh ct1bx ct1by ce3ag lu2dj lu3de py1em py2bf he1fg k7mn cm8uf ve1am ve1co ve1bp ve1bx ve1ck ve1gk ve1gl ve1cu ve1ic w6acl w6bsn w6cln w6cxw w6dev w6eak w6egh w6ejc w6ff w6nc w6us w7afr w7alb w7ff w7fh w7fl w7li w7sg w7vy pa0zf

14,000-kc. 'phone band

w4agr w9anz w9qy

7000-kc. band

cmz53 k4kd k5do x29a hafkx w6ac w6bhy w6bi w6bnc w6by w6car w6cjn w6exe w6dni w6doz w6dyn w6eks w6etj w6ks w7ahw w7nv w7vy

3500-kc. 'phone band

w3cv w3jz w3aex w2gj w2iu w8azk w8aju

W3AFK, Mr. J. Lawrence Evans, Jr., Daniel School Observatory, Franklin and Marshall College, Lancaster, Pa.

w1aar w1aky w1cgr w2aca w2amb w2apf w2bec w2bn w2boz w2bp w2ckj w2fr w2ga w2iu w2ji w2ju w2qn w3ain w3as w3avw w3cgb w3cz w3jf w4hn w8ahz w8aos w8brr w8bwx w8cwu w9bg w9elx w9nm

W2CBB, H. J. Conti, 15 Harbor Terrace Drive, Rye, N. Y.

7000-kc. band

w6ahp w6akd w6akf w6ase w6awp w6bam w6bas w6bfe w6bgf w6bqq w6by w6cgx w6cii w6crz w6cto w6cxw w6czx w6dcu w6dhc w6dpj w6dyj w6dzu w6ebg w6ec w6eke w6eva w6iky w6ef w6yx w7acf w7ahw w7nr k4aan k4acf k4kd d4aez cm2jm cm2ro cm2xc cm5fl cm8uf nj2pa nm9a nmxda nn1nic nn7nic ve1da ve2bb ve3bt ve3gt ve3xk ve4cu ve9ap ndb wsq

W8LA, Ralph E. Jackson, Box 226, Frankfort, Mich.

7000-kc. band

ti2rs k5dd k4dk k4kd k6ewb k6alm cm8yb cm8lc cm8dc he1fg zl1ft zl1fc zl2dg zl2ac zl2bg vk2jh vk2hm vk2hl vk3hu vk3pr vk3wx vk3jk vk3pm vk4bh vk5it vk5hg vk3jo vk5wr vk7ch pxr g5ml

14,000-kc. band

qq1a py1aw

W1ZB, Carl J. Madsen, Chicopee Falls, Mass.

7000-kc. band

w5nd w6axm w6bqk w6ebp w6enn w6eug w6diz w6dpi w6dyn w6eva w6cxw w6equ w7acf w7fb w7lz w7vy w7ag cm8yb fl1aw nj2pa

14,000-kc. band

w6aqj w6cyi w6dcv w7be w7na w7ty cm5cx cm8uf ct1bx he1fg he1le k4akv lu2aa lu3dh lu4da lu5ak oa4j on4uu ve4hg ve4ic vo8mc

W2BKZ, Charles T. Kolz, aboard S.S. "Toltec," United Fruit Co. Steamship Service

Off Florida coast

7000-kc. band

w9azy w3arp w8np w9ph w8hv w9cph w3amz w3bnu w5axx w8rt w5zn w2dp w8bgx w9kd w3anh w8cuq w9ebo w1as w8uf w4ik w1bjl ve3cz

At anchor, Puerta Cortez, Jan. 31, 1930

w5ave w2bai w3aws w4ei w2ags w4gd w8lt w5ajl w8wj w1ahl w2cvj w8aav w5aca w4rz w5aqy w8ddg w4qe w8qt w9ftt w8lt w9ahc w9bhh w2ard w3awm w2gg w5ae w8asq w5bdd w9fqs w9kb w8afm w2aof w4afw w6cqk w2bsc w4ha

"We found over a period of two years that CeCo Tubes were the most profitable to handle in more than one way."
ALBERT A. LIST, List Brothers Distributors, Fall River, Mass.

Increasing use of high-quality phone transmitters by amateurs created demand for rugged, long-lived, powerful modulator tubes . . . capable of withstanding heavy overloads and high voltages. The new CeCo 250 Tube with its rugged filament, high emission, small grid current and super vacuum is well adapted for this service.

FRANKLIN S. HUDDY, Assistant to Chief Engineer, CeCo Manufacturing Co., Inc., Providence, R. I.

DO YOU KNOW!

1. The CeCo million dollar factory of 3½ acres is the largest and most modern plant in the world devoted exclusively to the manufacture of radio tubes.

2. CeCo has pioneered in such tube achievements as the B-409, B-406, "G," "H," "K," Hi-Mu, the A.C. Screen Grid 224 tube and the A.C. Pentode.

● CeCo Tubes are licensed under patents and applications of Radio Corp. of America, and affiliated Companies.

1930
CeCo ***Radio Tubes***

Do You want to be a High Class Radio Operator?

You can be a Clear, Fast Sender, able to work with the best of them. You can be a Rapid, Accurate Receiver, able to copy the fast stuff with pen or typewriter. The Successful Methods used by the fastest and highest paid Radiomen are taught to you in

The Candler System of High-Speed Telegraphing

It is a Post Course of intensive training for developing Receiving and Sending Speed quickly through Scientific Methods (not trick theories). It trains the Brain, Muscles and Nerves to **Co-ordinate** in doing fast, accurate work. It develops the power of **Concentration**; gives you **Confidence** by making you sure of yourself at all times. No matter what your speed now is, we guarantee to increase it.

In big land stations and on ships at sea are successful operators who have taken and are taking the **Candler System.** "I owe my speed (55 wpm) to your **System.**"— Theo. McElroy, World's Champion. "Can copy fast stuff 3 to 5 words behind easily. Radio-Typing Course is best for radiomen."— Raymond H. Bell, **U.S.S. Idaho.** Thousands of letters like these pour into our offices from all over the world. *There's no substitute for the* **Candler System** *of High-Speed Telegraphing.*

If you want to get out of the "slow class" and do something, write for further information about this great **Course** and what it has done for over 45,000 operators. Give your present speed and tell us what you want to accomplish. Also ask about Radio-Typing Course.

The CANDLER SYSTEM CO.
Dept. RL.
6343 South Kedzie Avenue **Chicago, Illinois**

REL

POWER SUPPLY

All Amateur Stations are now compelled to emit a pure tone signal. This can only be obtained by use of an efficient Power Supply.

REL CAN ASSIST YOU WITH YOUR POWER SUPPLY PROBLEMS

WRITE FOR LITERATURE

RADIO ENGINEERING LABS.
INC.
100 WILBUR AVENUE
LONG ISLAND CITY, N. Y.

w9apd w6abd w6cgx w9dce w8ke w8bkp w2eas w2pc w4fp w3baj w8duw w9bks w3ake w9dwr w5bhq w9fey w4ahq w5akp w4hd w5bex w4cm em1by nn1nic x1mq em8yb zz1bb x5z

W1MS, Charles H. Horton, 173 No. Adams St., Manchester, N. H.

14,000-kc. band

ce5aa cm5cx cm8uf ct1aa ct1bx f8cs f8da f8ex f8fr f8fk g2ao g2kf g5by g5bz g5ml g5mz he1lc he2jm he2jo k4kd lu3de nj2pa oa1kc oa4r on4ft on4gn on4hc on4jj py1ca py2ba qq1a ve2be ve3rf ve4bu ve4bx ve4fk ve4fr ve5ao vk3zo vk3dy vk3pa zxda

W9ASV, Charles E. Perry, Motor Route 3, Box 821, Joplin, Mo.

ce1ai ce2ab ce2ac de2ak ce2bm ce3bf ct1bx ct3ab f8aap f8er f8cp f8fc f8fd f8hl f8hr g5by g5yg g6hp g6xb kfr5 k4ni k6etf no4uu py1aa py1aw py2ak xpaoja xpaozz zij x9a xbx zl1al zl1fb zl2aw wfat rwx wsq

W. A. Bousfield, York St., Bellerive, Tasmania

w1ajt w1ajy w1amj w1anz w1crw w1rw w1ry w2abu w2ahz w2ait w2arb w2bda w2bjg w2ct w2dab w2jw w2qf w2rz w2tp w3aiz w3aur w3ja w3qv w4abw w4ft w5afb w5dyk w5ql w5ry w6asl w6awz w6bax w6can w6dnx w6dzm w6eug w6fk w6qy w6vz w7qr w8az w8avp w8dsi w8xk w9auh w9beu w9dgz w9ef w9eta w9fbv w9fxj ac2ff ac3ma au1kab bam ce1ah ce1av ct1aa d4abg d4an d4by d4uak d4uj d4yt ear21 f8alp f8da f8dmf f8do f8dot f8fr f8gdb f8gua f8ho f8ix f8jf f8olu f8rrr f8sm f8wb w8zx g2bm g2od g2sw g2xv g5bz g5by g5uq g5wp g5yx g6dh g6hp g6nt g6vp g6wy g6rb g6ut haf8b j3ch k1hr k1pw k1sc k1xa k4aan kfr5 oh2nad ok2ny on4bz on4fe on4fp on4hp on4il on4ja on4jj on4us on4vo on4ww oz7t oz7y pb7w pk3bm sm6ua ti2hv un7ww uosx velar ve3aq ve4dj x9a x9b rwx wfa

Experimenters' Section

(*Continued from page 33*)

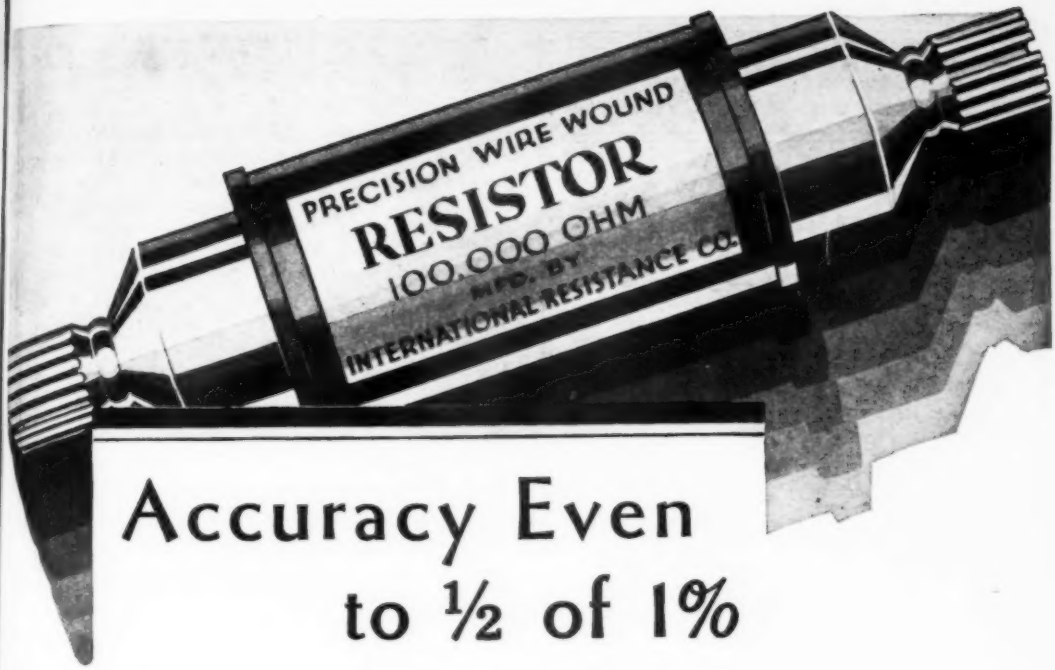
would be of great interest to many amateurs. Another thing — if you have an idea which you think ought to work, but which you haven't the time or facilities to try out, send it in anyhow — someone else may be in a position to try it, and it may turn out to be good. If you have a problem which you can't solve you will very often find that someone else has found a solution, so if you let us know about it we can often make mention of it and bring forth a lot of responses. In other words, look at the "X" Section as being a clearing house for ideas and helpful kinks, and remember that if you are interested in knowing what the other fellow is doing, he is probably just as much interested in hearing what you have done also. The only thing which can ever destroy the usefulness of this section will be lack of material, and we have no doubt that the average ham has enough ingenious stunts to keep us going for years and years. Just how good we make it is up to all of us who are doing things and overcoming difficulties every day in the course of our radio life.

More Progress on 28 Megacycles

(*Continued from page 32*)

in the T & R Bulletin. We will present a few items of interest.

G2OD copied W9EF solid on February 2nd



Accuracy Even to ½ of 1%

The new Durham wire-wound precision resistor can be secured to an accuracy of ½ of 1% . . . made especially for uses where accurate, high value, non-inductive, low distributed capacity resistors are required.

Data sheets of this and other resistors sent gladly upon request. Please mention types and values in which you are interested.

DURHAM METALLIZED

RESISTORS & POWEROHMS

INTERNATIONAL RESISTANCE CO.

2006 Chestnut Street, Philadelphia, Pa.

!! STOP !!

Use
Potter Replacement Blocks and By-Pass Units for Service Work

To Give
The Old Receiver
New Life
This Is The Difference
Which The Set
Owner Hears

THE POTTER CO.
North Chicago, Illinois
A National Organization at Your Service

BARGAINS

Motors back geared 110 A.C. variable speed, auto reversible (Socony oil burner type) has over one thousand uses, a very good buy **$7.50**

Resistors, vitrohm, screw base, 600, 900 or 2000 ohm	$ .50
Resistance, variable 200 ohm 1.5 amp.	1.00
Rheostats vitrohm, variable Ward Leonard, 500 ohm .2 to 1.5 amp 35 tap field reg. type	5.00
Rheostat, vitrohm, variable, Ward Leonard, 6 ohm 15-5 amp. bat. charge type	3.50
Resistors, vitrohm Ward Leonard, with leads, ass. sizes per doz.	1.50
Relays 2 and 5 kw. (110 or 220 volt) ¾ silver contacts	7.50
Relay West. Elec. low voltage, 2 upper and 3 lower platinum point screws, 3 contact arms	5.00
Extra platinum contact screws or arms	.35
Amplifier, W.E. Radiophone, C.W. 926	15.00
Heterodyne, Signal Corps, type B.C. 104. 1000 to 3000 meters, with detector	15.00
Receiver, Type 122, 175–275 meters. Especially recommended for "standby" for coastal Broadcast stations as required by Dept. of Commerce	50.00
Air compressors, Kellogg, Model T. 1½ cu. ft. per min. weight 6 lbs., 600 R.P.M., 125-lb. Requires ¼ h.p.	3.00
Motor generator, R & M, 110 D.C. 3½ h.p., 2 kw., 20 volt D.C. 80 amp. Great for large station filament supply.	125.00

MANHATTAN ELECTRIC BARGAIN HOUSE
DEPT. Q, 105 FULTON ST., NEW YORK

while BRS250 reported the same station with extreme fading! On February 9th G5WK heard only W2JN and ZS4M whereas BRS250 heard six W stations and ZS4M. These incidents are mentioned to show that accurate and complete reports on signals are necessary. Locations separated by only a short distance may alter reception remarkably. It seems from perusal of reports that barometric conditions enter into the scheme of things on 28 mc. Therefore it would not be amiss to keep close tabs on barometric pressure and general atmospheric conditions.

NKF is logged in England on both 28 and 32.8 mc. G5YK reports the signals from this station r10 on the latter frequency. In general there appears to be a great deal of interest in the British Isles on 28 mc.

From an early report in the T & R Bulletin we are reprinting the W and VE stations that were worked or heard (during the tests) in the British Isles and Europe. (Stars denote number of extra times reported.)

W1BJD, W1ZL****, W1CMX**, W1CPB
W2JN**********, W2AQB*******,
W2NM****, W2BG**********,
W2ACN*******
W2FF, W3CKL, W3AQI**
W4AKT*
W6BAX*
W8DJV**********, W8APD*, W8ADM*******,
W8S8******, W8APB*
W9EXW*******, W9BZG, W9DGK, W9EQV,
W9BYC***, W9AZZ**********
W9EF**********
W9BBA**********

Atlantic Division Convention

Erie, Pa., June 27–28

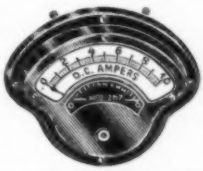
FELLOWS, here's what the Erie Amateur Radio Club is planning for you during the two day convention to be held at Erie, Pa., June 27th and 28th. The convention proper will be held in the Hotel Lawrence with many side lines to attend. Speakers you read about and wished that you could hear will talk on subjects close to the hearts of the amateurs; moving pictures, illustrations, demonstrations and visitations will be the order of the day. On Friday, the 27th June, the gang will have the privilege of visiting Presque Isle State Park (this park is not a sheckel grabber) where there will be swimming in Lake Erie, boating, sports, walks, talks and a fish luncheon. The Radio Inspector will be present to give license examinations. A.R.R.L. Headquarters are sending F. E. Handy, the Communications Manager and A. L. Budlong, Assistant Secretary (the same Bud of PRR fame).

The best of it all fellows is the price — only $4.00 for the two days, but if you send in your reservation by June 17th, the price will be $3.50.

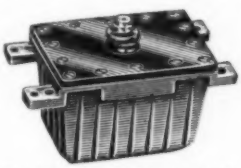
Send in your reservation to Raymond Wagner, Secretary Erie Amateur Radio Club, 707 East Fifth Street, Erie, Pa.

BARGAINS ARMY AND NAVY RADIO SURPLUS

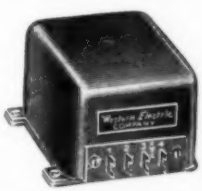
Ammeter, R.F., O-10 amp. zero adjuster, 4 in. diameter. A real buy at.....$6.50



Ammeter, Weston No. 267. Double reading 40–0–50. Voltmeter, Weston No. 267, 0—75 volts, each.....$6.50



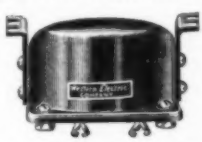
Condenser, Dubilier and Wireless Specialty, op. volts 12,500 cap. .004 $12.50 to 20.00



Transformer West. Elec., output, No. 102A, 4 to 1 ratio.....$3.50

Transformer West. Elec., output, No. 202A, 5 to 1 ratio.....$3.50

Transformer West. Elec., input, No. 201A, 7 to 1 ratio.....$3.50



Coils, Retardation, West. Elec. Co. 57C, .83 ohm, 2 windings .08 henry.....$1.00

Ret. coil West. Elec., No. 65A, 1800 ohm, 12 henry $2.00

Ret. coil West. Elec., No. 66A, 85 ohm, 1.3 henry..$1.50

Ret. coil West. Elec., No. 64B, 11 ohm, 1 henry...$1.50

Generator, airplane, Signal corps, with shaft, can be used as motor, 12 volt 33.6 amps. 5000 R.P.M.....$10.00

Generators, 12 volt, 60 amp. has automatic controls..... 20.00

West. Elec. Dynamotor, C.W. 927, two D.C. 32/350 volt dynamotors in noiseless hangar. Used in parallel gives 160 mils at 350 volts, series gives 80 mils. 700 volts, suitable for xmitters and receivers. New low price.. 20.00

West. Elec. swtchbd. control panel for above dynamotors, has switches, 0–50–500 voltmeter, complete filter system, etc. Special..... 8.00

Ammeter, Weston No. 425 thermo-couple 0–2 amp., mtd. on large bakelite base with D.P. hi voltage switch.... 7.50

Ampere hour meter, Sangamo, battery charge and discharge, type MS 0–500 scale, capacity 15 amp..... 10.00

Milliammeter, Westinghouse, 0–150 surface mtg., b. con. 5.00

Milliammeter, Westinghouse, type, C.A. 0–500, zero adjustment, flush mounting. $10.00 value..... 5.00

Voltmeter, Westinghouse, type C.A. 0–25, zero adjustment, flush mounting. $10.00 value..... 5.00

Motor generator, Crocker Wheeler or Holtzer Cabot, 110 D.C. 220 A.C., 500 watt, 500 cycle. Ball bearing.... 50.00

Complete line 500 cycle motor generators ¼ to 5 K.W.

Transformers, General Electric, 125 to 2500, with center tap, 60 cycle, 200 watt..... 7.50

Transformers, Simon, 220 to 11,500 closed core, ½ K.W., 500 cycle, "pancake" secondary..... 5.00

Transformer, Amertran, oil immersed, 1 K.W., 500 cycle, 220/8000 volt..... 10.00

Condensers, transmitting, Murdock .0017 mfd. 12,000 volt, ideal for plate blocking..... 2.50

Condenser, Dubilier, mica, op. volts 12,000 cap. .0004... 10.00

Condenser, Dubilier, mica, volts 40,000 cap. .0012–.001–.0008 or .003..... 30.00

Condenser, Dubilier, mica, op. volts 8500 cap. .004..... 10.00

Condensers, West. Elec. 21 A.A., 1 mfd. 1000 volt A.C. test..... 1.00

Condensers, Grid, with leak, mica Dubilier (Aircraft) .003 mfd. 1500 volt, 15,000 ohm..... 2.50

Headphones, West. Electric No. 194W same as C.W. 834, 2200 ohms, D.C. slightly used..... 5.00

Holtzer Cabot, "Mike" Utah type, carbon granular transmitter. Special..... .95

Western Electric Radiophone Transmitter unit, 326W. Special..... 1.50

Dynamotor, aircraft 32/275 volt, with shaft..... 10.00

NAVY Dynamotors General Electric 24/1500 volt. 233 mils. (Extended Shaft — $3.00 extra)..... 37.50

Edison storage battery cells, nickel alkali, 225 amp. hour, 1.2 volt type A-6, weight per cell 20 lbs..... 4.00

Induction coil, platinum contacts, can be used as Hi. pitch buzzer..... 1.50

Telegraph and buzzer portable sets, mahogany case, 2 tone 4 contact platinum contact high frequency buzzer, 2 telephone toggle switches, potentiometer, sending key, 3 mfd. condensers, transformer and 2 choke coils, receiver, $30. value..... 5.00

Magnetos, Army mine and ringer type, 4 large magnets.. 1.00

Sounders, Signal Corps, 120 ohms, adjustable..... 2.50

Spark transmitter, complete, airplane type, rotary gap, transformer, mica condenser, 200 watt 900 cycle with Gen. self x-cited ball-bearing..... 35.00

Generators, Westinghouse 110 volt, A.C. 900 cycles, 200 watts, self excited..... 15.00

Generator ¼ kw. 500 cycle, 300 volt, self x-cited, can be hand driven..... 25.00

Voltmeters, D.C. portable new Weston model 45, 3 scale 0–3–15–150 guaranteed ¼ of 1% accurate..... 40.00

Ammeters, D.C. portable, new Weston model 45, 3 scale 0–1.5–15–150 with 3 scale external shunt and leads ¼ of 1% accurate..... 40.00

Loud Speaker Unit 193 West. Elec. Ideal or monitoring. Transmitter with Horn..... 5.00

Headphone, Army, with strap, 120 ohm..... .75

Headphone, Radio School, leather headband, 75 ohm.... 1.50

Keys, transmitting, Navy, back connected on bakelite base. 2 kw., ¾-inch silver contacts..... 5.00

Keys, xmitter, 2 kw., comb. relay and hand ½" silver contacts..... 10.00

Keys Navy, ¼" silver contacts..... 1.50

Charging panel, Navy type, S.E. 899, 32 volt, Ward Leonard, var. and fixed res., Weston voltmeter and ammeter, Sangamo ampere hour meter. Complete with all switches..... 30.00

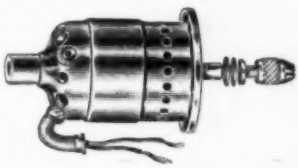
Buzzers, Western Electric, Extra quality, high frequency 1.50

Receivers, Navy, C.N., 240, 1000–10,000 meters..... 50.00

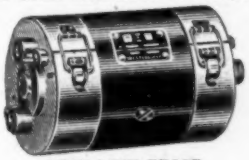
Receivers, S.E. 143 and I.P. 500.....100–150

Lightning Switch, High Grade W.E. Heavy Copper Blade and Contacts. Size 7 x 8 x 6 high. While they last. $3.50

AT LAST — Genuine Western Electric Hand Microphone Home Broadcaster. $3.50 used, $5.00 new.



Portable Hi-speed Universal Hamilton-Beach Drill, takes up to ¼ in. Complete with Chuck, Buff and Grind Attachment.....$7.50



NEW LOW PRICE

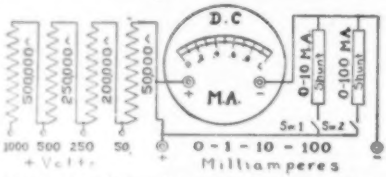
Dynamotor 32/350 volt, ball bearing, 80 mills. Special.....$12.50

U. S. Army Telegraph Set, key, sounder, D.P.D.T. switch, 2 large magnets, in portable carrying case. Less Batteries.....$6.00

Largest Radio and Electric Supply House in U. S. specializing on Army and Navy Surplus. Write us your particular requirements. *Sufficient postage* and deposit of 20% required on C.O.D. orders. NO C.O.D. ON CANADIAN ORDERS. DUE TO LIMITED GOV'T SURPLUS WE DO NOT ISSUE CATALOGS.

MANHATTAN ELECTRIC BARGAIN HOUSE, Dept. Q, 105-7 Fulton St., New York City

Build Your Own Multi-Range Volt-ammeter



The Super Akra-Ohm wire-wound Resistors and Shunts afford an inexpensive way to build an accurate Multi-Range Volt-ammeter as shown in the above diagram. They are carefully designed to insure an **accuracy** of 1 per cent and a constant permanency of calibration. Their use is highly recommended for Laboratory Standards, High Voltage Regulators, Telephone Equipment, and Television Amplifiers, Grid and Plate Resistors, etc.

500 to 80,000 ohms.....$1.50
90,000 to 150,000 ohms..... 2.00
175,000 to 250,000 ohms..... 2.50
300,000 to 500,000 ohms..... 3.00

SHUNTS for increasing the range of milliammeters, **$3.00 each.**

Send us your dealer's or jobber's name and we will send you Bulletin 62-C, containing the original voltage multiplier chart for the use of Super Akra-Ohm Resistors for constructing Multi-Range Voltmeters.

Shallcross Mfg. Company
ELECTRICAL SPECIALTIES
700 PARKER AVENUE
Collingdale, Pa.

Financial Statement

BY order of the Board of Directors the following statement of the income and disbursements of the American Radio Relay League for the first quarter of 1930 is published for the information of the membership.

K. B. WARNER, *Secretary.*

STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED MARCH 31, 1930

REVENUE

Advertising sales, *QST*	$16,854.85	
Newsdealer sales	11,657.84	
Advertising sales, Handbook	1,765.00	
Handbook sales	7,274.79	
Membership dues	12,319.40	
Miscellaneous receipts	1,013.69	
Emblems	173.50	
Interest earned	723.95	
Cash discounts earned	280.57	$52,063.59
Deduct:		
Returns and allowances	$3,270.38	
Less portion charged to reserve for newsdealer returns	127.36	
	3,143.02	
Cash discount on sales	356.25	
Exchange and collection charges	31.35	3,530.62
Net revenue		$48,532.97

EXPENSES

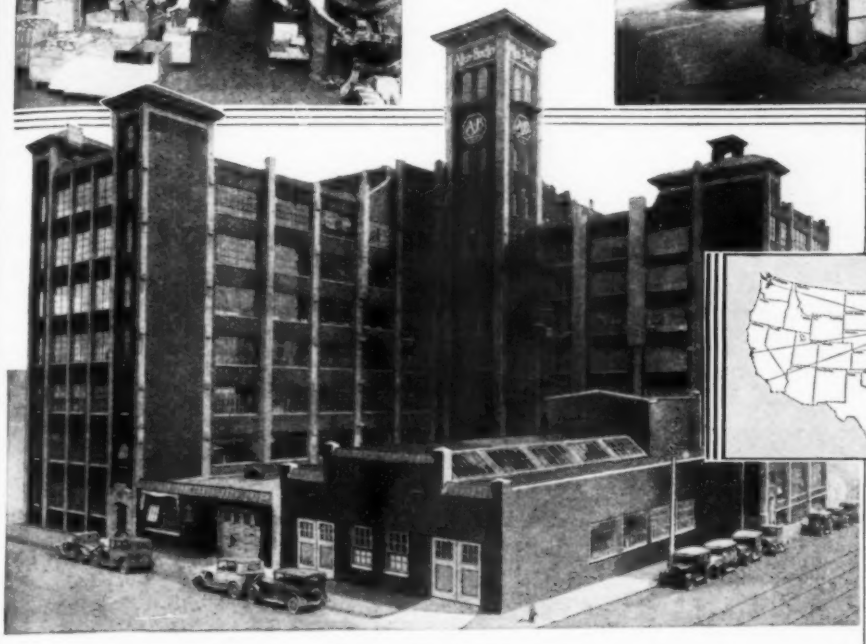
Publication expenses, *QST*	$12,939.32	
Publication expenses, Handbook	4,355.63	
Beginners' Booklet expenses	1,984.65	
Salaries	15,338.01	
Forwarding expenses	962.36	
Telephone, telegraph and postage	1,388.63	
Office supplies and general expenses	2,590.59	
Rent, light and heat	960.13	
Traveling expenses	876.09	
Depreciation of furniture and equipment	494.18	
Communications Department field expenses	60.57	
Headquarters Station expenses	122.88	
Bad debts written off	87.22	
Total expenses		42,160.26
Net gain from operations		$6,372.71

Strays

Sponge-rubber kneeling pads (price twenty-five cents in the so-called five-and-ten stores) make good shock absorbers for transmitters and receivers. The traffic hound who copies on a "mill" can also use one to advantage to reduce local QRM — *W1AJS.*

An opening winding in an audio transformer can often be repaired by applying a fairly high voltage across its terminals momentarily. W5AZV suggests using about 500 volts, either a.c. or d.c., and the open circuit will usually be repaired in less than five seconds. The voltage must be high enough to jump the gap in the winding, and the resulting arc welds the ends together.

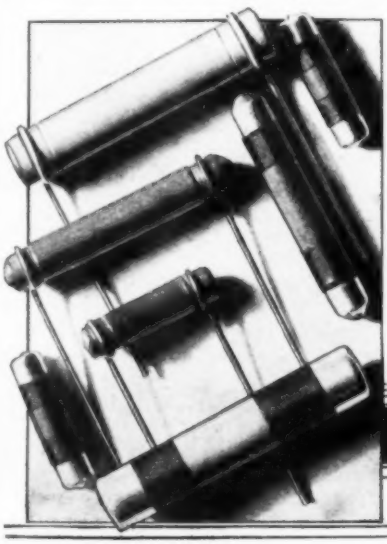
The Allen-Bradley plant, private substation and electric furnace building face upon four streets, assuring daylight in all departments.



Sales offices are located in all leading cities. Consult your nearest Allen-Bradley district office.

There's a Big Plant and 25 Years of Resistor Experience

back of the huge production and uniform quality of Bradleyunits



WHEN radio was popularized, a few years ago, the Allen-Bradley organization had already achieved distinction as producers of electric controlling apparatus and resistors. To meet the demand, at that time, for a reliable filament rheostat, millions of Bradleystats were sold to radio manufacturers and amateur set builders.

Today, Allen-Bradley Fixed Resistors—Bradleyunits—are used by the world's largest set builders.

Floor after floor of automatic machinery and precision testing equipment, under the supervision of skilled engineers, produce Bradleyunits in stupendous volume. Such facilities are your best insurance of a continuous supply of reliable resistors to meet your specifications.

ALLEN-BRADLEY CO., 277 Greenfield Ave., Milwaukee, Wis.

ALLEN-BRADLEY RESISTORS

Produced by the makers of Allen-Bradley Control Apparatus

Your A.R.R.L. EMBLEM

The League Emblem comes in four different forms. Its use by Members is endorsed and encouraged by the League. Every Member should be proud to display the insignia of his organization in every possible way.

THE PERSONAL EMBLEM. A handsome creation in extra-heavy rolled gold and black enamel, ½" high, supplied in lapel button or pin-back style. The personal emblem has come to be known as the sign of a good amateur. It identifies you — in the radio store, at the radio club, on the street, traveling — you can spot an amateur by it. Wear your emblem, OM, and take your proper place in the radio fraternity. Either style emblem, $1.00, postpaid.

THE AUTOMOBILE EMBLEM. 5 x 2½", heavily enameled in yellow and black on sheet metal, holes top and bottom, 50c each, postpaid.

THE EMBLEM CUT. A mounted printing electrotype, the same size as the personal emblem, for use by Members on amateur printed matter, letterheads, cards, etc. $1.00 each, postpaid.

THE "JUMBO" EMBLEM. How about the shack wall or that 100-footer? Think of the attention this big yellow-and-black enamel metal emblem will get! 19 x 8¼", same style as Automobile Emblem. $1.25 each, postpaid.

The American Radio Relay League
Hartford, Conn.

I.A.R.U. News

(Continued from page 54)

We regret that we have been unable to secure any picture suitable for reproduction in the department this month. Several have come in, but they all possess some inherent defect which makes it impossible to use them here. So many good and interesting photos are too dark, or too small, or are not of the glossy type, and as a result cannot be used.

We solicit pictures of all sorts; stations, operators, officials of I.A.R.U. sections; anything and everything of general interest to the readers of this department. If they are suitable they are almost certain to be used.

— - - - —

BELGIUM SECTION

By Mr. Paul de Neck, President of the Reseau Belge

On the two active bands, the DX conditions were much better this month and good records were made.

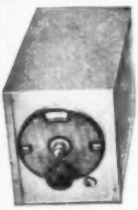
On the 14-mc. band in the beginning of February the best hours for DX were certainly from 0700 to 0830 G.M.T. and from 1400 to 1700 G.M.T. Midday work gave good results with Australia, India, New Zealand, and some U. S. districts.

The following contacts were made: ON4BC worked ZL and W stations in the early morning. In order to have good juice when he got up to punch the key, he made a very pleasant use of his alarm clock! A few hours before time came to get out of bed, a special contact would switch on a relay and put his batteries on charge. Hi! ON4FP continues his good DX work with VU and ZL stations, being received R8 by ZS5S. ON4HA worked W, FR, and CT2. ON4UY is received R4 by VK5HG.

On *inside aerials*, the following contacts were made: ON4WC worked EAR and SP with 20 watts. ON4GK has been received R7 by XGAOB (Shanghai, China.)

On 'phone ON4KIR is R8 at I1SS at Napoli, Italy. ON4HU had his good modulation received R7 in the Baleares Island (Atlantic). ON4GK had his fone received in OH, HB, F, SP, and Sicily (Italy.) ON4HY worked the North African coast on 'phone, being received R9. He uses an m.o.p.a. of 60 watts, a Zepp aerial, and a modulation system known as the "Beauvais." ON4FT would be very glad to sked with all hams for working from his auxiliary sailing yacht "Tenacity," which will be on with the call letters XON4FT, during the beginning of next June. Every QSO will be acknowledged with a good photo of the ship. Wave: 14,000-kc. band (upper part), d.c. note, m.o.p.a. set. ON4UU continues his DX 'phone tests on 14,000 kc. working Brazil, India, and Australia, being received on the loudspeaker on several occasions. On code he worked

Leeds Listening MONITOR



For checking your note, its stability and whether D.C. or not. THE ONLY SURE CHECK. Gives you an accurate idea as to what your signal sounds like to the other fellow. The Leeds Monitor is encased in an aluminum shield, 5" x 6" x 9" overall. Completely shielded, with batteries self contained. Supplied with A. & B. batteries, but without 1-UX.

Special 199 tube..... **$15.00**

Make your own transmitting and receiving coils. Copper tubing transmitting inductance.

	Size of tubing		
Inside Dia.	*3/16"*	*1/4"*	*5/16"*
2 1/8"	9c	10c	12c*
2 3/8"	9c	10c	15c*
3 1/8"	10c	12c	17c*

Prices per turn

Thordarson B-Eliminator Transformer..... **$1.65**

Thordarson 150 watt Transformer..... **$3.95**

Leeds 50 watt socket specially priced. See previous issues of *QST* for details.

LEEDS

The Home of RADIO

45 VESEY STREET

NEW YORK

New York's Headquarters for Transmitting Apparatus

When in Town Visit Our Store

EVERYTHING IN

ACME JEWELL PYREX
BRADLEY FLERON
THORDARSON
ELECTRAD NATIONAL
LYNCH SIGNAL
FLECHTHEIM
NATIONAL RECTOBULB
GENERAL RADIO
CARDWELL

IN STOCK

Leeds Microphone STANDS

Beautiful copper oxidized finish. Very sturdy construction. Artistically designed, effective appearance.

Desk Type, Price..... **$4.75**

Floor Type, Price..... **$9.75**

Adjustable to 7 feet

NEON GLOW LAMPS

Super Sensitive

For wave meter and other uses; candelabra base. ¼ watt, ¾ inch diameter. 1¾ inch long over all. Special..... **$1.75**

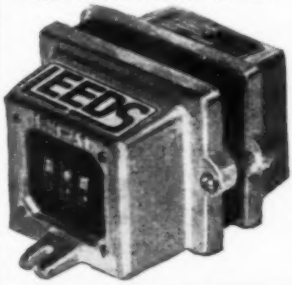
Porcelain base socket for above lamp..... 10c

Aluminum Shield cans and panels of every description to order.

Leeds Filament TRANSFORMERS

All primary windings for 115 volts, 50–60 cycles. Extra heavy construction, will stand considerable overload. Heavy end castings.

Type — L.F. 30 — secondary 7½ volts centre tapped; capacity 30 watts. Price..... **$5.50**



L.F. 80 — secondary 12 volts, centre tapped, capacity 80 watts. Price **$6.50**

L.F. 175 — secondary 12 volts, centre tapped, capacity 175 watts. Price **$9.75**

L.F. 25 — secondary 2½ volts, capacity 10 amperes. Price..... **$7.80**

Special LEEDS lead-in bowls made of Pyrex. Two cups size 3¼" dia. x 2½" high; supplied complete with 18" brass rod and hardware. Price complete..... **$2.25**

Larger size cups 6" dia. x 4½" high; complete set two cups, hardware and 24" brass rod. Price complete..... **$4.25**

We are in a position to supply all parts necessary to enable you to conform with the new current regulations

DUBILIER HIGH VOLTAGE FILTER CONDENSER

4 MFD. D.C. Working Voltage 600 V

These Filter Condensers are designed for use in filter circuits in Transmitters, and all high Voltage Socket power devices and Power Packs.

SPECIAL $2.25

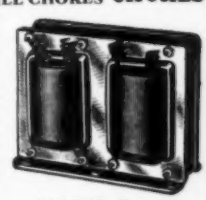
TYPE PL 571

List Price $7.25

THORDARSON DOUBLE FILTER CHOKES

CONTAINS TWO 18 HENRY 250 MILL CHOKES

Heavy duty, rugged double Filter Reactor for Filter Circuits in Transmitters, Power Amplifiers, "B" Eliminators and various other purposes. ¶ Each Choke has a 2000 Volt insulation and the D.C. resistance of each Choke is 108.5 ohms. ¶ When connected in series this Filter Reactor has a capacity of 36 henries at 250 mills, and when connected in parallel 18 henries with 500 mills carrying capacity.



SPECIAL **$6.25**

MODEL T-2458

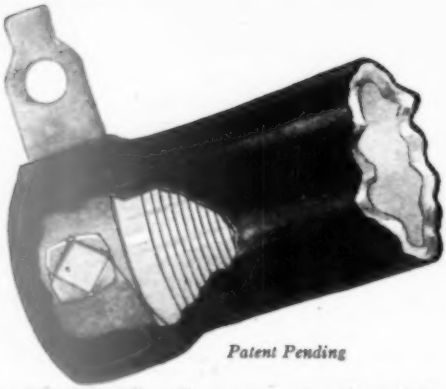
List Price $19.50

LEEDS RADIO LABORATORIES

Precision Custom Built Short Wave Receivers and Transmitters

This department under the supervision of the Short-Wave Specialist Jerome Gross. We design, construct and advise on any material for the "Ham" Broadcasting station or laboratory. Write Jerry Gross for advice on any of your problems.

PLEASE PRINT YOUR NAME AND ADDRESS PLAINLY to AVOID DELAY | **WRITE FOR SPECIAL PRICE LIST** | **MAIL ORDERS FILLED SAME DAY** 10% Cash Must Accompany All C. O. D. Orders



Patent Pending

Two New Contacts for You

Our Catalog brings simplified Resistance Computing Tables. Write us for it — and ask too for a description of the New HH Contact.

ONE of them is shown above — the new Eyelet Contact that is now a standard part of every HH RESISTOR. It has been universally approved by Electrical and Radio Engineers for its effective reduction of *contact resistance* through increased, *fixed contact areas* between wire and terminal.

The other new contact is the one that we welcome between your organization and ours. We are making RESISTORS for an impressive list of leaders in the industry. There are definite reasons why you should be among them. May we tell you what they are?

RESISTORS

Hardwick, Hindle, Inc.
218 Emmet St. Newark, N. J.

HAMS! WE PAY THE POSTAGE

218 Chestnut St. **HALL'S** Harrisburg, Pa.

COMPLETE STOCK OF HAM SUPPLIES

Lowest Prices — Write for Literature

Aero — National — Thordarson — R.E.L. — Flechtheim — Bradley — DeForest — Perryman — Jewell — Readrite — Signal — Sangamo — Pilot — Frost — Hammarlund — Gen. Radio — Call Books — Hand Books — Ohmite — Fleron.

Do you know that the latest Handy and Hull Handbook is available in bound form — $2.00 per copy, postpaid.

When ordering a copy of this new sixth edition, look at your present copy and determine if you want your next copy in more permanent form.

HILET

Announces new line of adjustable gap **Giant** Choke Coils with the same dollar value that made our transformers popular thruout the world. 100H–80 MA, 22 lb, **$12.00**. 50H, 160 MA, 22 lb., $12.00. 30H–320 MA, 25 lb., **$14.00**. 15 H, 500 MA, 32 lb., **$16.00**. 3H–4000 MA, 22 lb., **$12.00**. Transformers — 500 watt, 1000–1500 each side, $15.00, 250 watt 500–750–1000 each side, $10.50, 150 watt 325–375 each side, **$9.00**. Filament any voltage. Tapped primary **$6.50**. Specials to order. Prices are mounted with leads. For De luxe model with fuse and terminals add **$3.50**. Name Plates for transmitter panels engraved to order, **$2.00**. Blanks, **75c**. Write for specifications.

One Day delivery

HILET ENGINEERING CO., Orange, N. J.

the habitual DX, and made his first contact with Japan.

Up to now the following records are listed at the R.B.:

ON4FT, WAC — 73 countries worked.
ON4RO and ON4UU, WAC — 70 countries worked.
ON4FP and ON4RS, WAC — 68 countries worked.
ON4ZZ, WAC — 63 countries worked.
ON4HP and ON4JJ, WAC — 51 countries worked.

Last Sunday, March 9th, the hams of the Reseau Belge met in a splendid ham fest, beginning in the morning by a visit to the laboratories of the control Center of the Union Internationale de Radiophone, conducted by Mr. Braillard, the world known radiotrician, President of the Union. Mr. Braillard presided over our lunch and our general annual meeting of the afternoon. The evening before, Mr. Braillard gave us a very interesting and vivid lecture on the actual technic of short wave radiophone stations. We had the very great honor and pleasure of enlisting Mr. Robert Goldschmidt, the radio pioneer, and Mr. Braillard as members of honor of our society. At the end of our banquet, a big cake of almonds and honey representing a super-het with loop aerial and controls, was presented Mr. Braillard as acknowledgment of his good work in ruling the congested European ether in the matter of broadcasting and introducing the splendid stability which is now the principal quality of our broadcasting stations.

Please, my foreign friends, do not forget to enlist yourselves for our July next big International Amateur Congress in Antwerp, Liège, and Brussels. Don't lose this good opportunity to visit your Belgian radio friends.

BRITISH SECTION

By J. Clarricoats, G6CL, Hon. Sec. R.S.G.B. & B.E.R.U.

The chief matter of interest to record during March is the successful manner in which the 28-mc. band was used. On behalf of the council of the R.S.G.B. I wish to thank very cordially all those overseas amateurs who assisted our Contact Bureau stations in their efforts to probe the mysteries surrounding the semi-ultra high frequencies.

The premier 28-mc. contact with Rhodesia (BQ2BH) was made by G6LL on March 2nd; this station was also heard in Brazil on the same day. Many successful QSO's were made with SUSRS but except for March 9th North American's were badly received.

The Powditch Trophies will be presented to the winners of these tests at the next R.S.G.B. Convention.

On 7 and 14 mc. there was no outstanding work accomplished.

The W.B.E. certificate is now being issued and has been awarded to many British & Colonial

R. T. I. R. T. I. QUALIFIES YOU TO MAKE MONEY AND ITS SERVICE KEEPS YOU UP-TO-THE-MINUTE ON THE NEWEST DEVELOPMENTS IN RADIO, TELEVISION AND TALKING PICTURES R. T. I.

$60 to $125 00 A WEEK Radio Operator

$8 to $15 00 A DAY Servicing and Repairing Radio Sets

$5000 00 A YEAR AND UP Radio Engineer for Broadcasting Station

$85 00 A Week Installing and Repairing Talking Picture Equipment

GOOD JOBS *Right at Your Finger Tips*

WHEN YOU ARE R.T.I. TRAINED IN

RADIO-TELEVISION ~ *Talking Pictures*

BIG PAY JOBS! SPARE TIME PROFITS! A FINE BUSINESS OF YOUR OWN! They're all open to you and other live wire men who answer the call of RADIO. The fastest growing industry in the world needs more trained men. And now come Television and Talking Movies—the magic sisters of Radio. Will you answer this call? Will you get ready for a big pay job NOW and step into a BIGGER ONE later on? You can do it EASILY now.

FRED H. SCHNELL
Chief of R. T. I. Staff
Twenty years of Radio Experience. First to establish two-way amateur communication with Europe. Former Traffic Manager of American Radio Relay League. Lieut Commander U. S. N. R. Inventor and Designer Radio Apparatus. Consultant Radio Engineer. Now in charge of R. T. I. Radio Training — and you will like his friendly manner of helping you realize your ambition.

R. T. I. Home Training Puts You in This Big Money Field

Radio alone, pays over 200 MILLION DOLLARS a year in wages in Broadcasting, Manufacturing, Sales, Service, Commercial Stations and on Board the big sea going ships and many more men are needed. Television and Talking Movies open up other vast fields of money-making opportunities for ambitious men. Get into this great business that is live, new and up-to-date, where trained service men easily earn $40 to $50 per week, and trained men with experience can make $75 a week, and up.

Easy To Learn At Home—In Spare Time

Learning Radio the R. T. I. way with F. H. Schnell, the "Ace of Radio" behind you is EASY, INTERESTING, really FUN. Only a few spare hours are needed and lack of education or experience won't bother you a bit. We furnish all necessary testing and working apparatus and start you off on practical work you'll enjoy—you learn to do the jobs that pay real money and which are going begging now for want of competent men to fill them.

Amazingly Quick Results

You want to earn BIG MONEY, and you want some of it QUICK. R. T. I. "Three in One" Home Training—Radio-Television-Talking Movies—will give it to you, because it's easy, practical, and is kept right up-to-date with last minute information. In a few weeks you can be doing actual Radio work, making enough EXTRA MONEY to more than pay for your training. In a few short months you can be all through—ready to step into a good paying job or start a business of your own. A BIG JOB—BIG MONEY—A BIG FUTURE. There is no other business in the world like it.

Investigate—Send For R. T. I. Book Now

Don't waste a minute. Find out what the great Radio industry, which has grown faster than the Automobile and Motion Picture business, has to offer you. Find out what other men are earning. SEE HOW EASILY YOU CAN GET STARTED. Get the facts about Radio, Television and the Talking Pictures, first hand, in the big R. T. I. FREE BOOK. Learn what this R. T. I. "Three in One" Home Training can do for you. Mail the coupon for FREE BOOK NOW.

RADIO & TELEVISION INSTITUTE
Dept. 10-A
4806 St. Anthony Court, Chicago

R.T.I. Training Brings Big Jobs Like These!

$500 EXTRA MONEY IN 2 MONTHS
Your radio course has enabled me to earn over $500 in two months. This is all spare time work, as I have a permanent position with my father in our store. I give you all the credit for the above. —J. NOFFSINGER, R. 1, Box 37, Greenville, Ky.

MAKES $25 A DAY
I make as high as $25.00 per day and have made $600.00 in 2 months from Radio work. That's not so bad when I'm only 19 and in a small town. You did all you said you would and much more.—FLOYD KNISELY, Box 91, St. Joe, Ind.

SALARY RAISED 33 1-3%
I am now Radio Service Manager for the H. N. Knight Supply Co., distributors for Eveready Radio Receivers in Oklahoma, and Texas Panhandle, with an increase in salary of about 33 1-3% since I enrolled with your school. —EARL P. GORDON, 618 E. 6th St., Oklahoma City, Okla.

RADIO & TELEVISION INSTITUTE
Dept. 10-A, 4806 St. Anthony Court, Chicago

Send me Free and prepaid your BIG BOOK "Tune In On Big Pay" and full details of your three-in-one Home Training (without obligating me in any way).

Name .....

Address .....

City ..... State .....

R. T. I. R. T. I. TRAINS YOU AT HOME FOR A GOOD JOB OR A PROFITABLE PART TIME OR FULL TIME BUSINESS OF YOUR OWN

1920 1930

Dodge Radio Shortkut

W8ARZ tried old way, stuck at 8 per. Used DRS and raised to 25 per — spare time two weeks. W9EBF anchored at 10 per. Used DRS and soon copied at 25 per. Now Chief at KMMJ.

Dodge High Speed

W5AHM raised speed from 27 to 39 per in 75 minutes—5 practice sessions, 15 minutes each.

Dodge Morse Shortkut

KILLS MIXUP—Both codes now used by W2BXY, W5ANW, W8CJK, W8BFA, W9EBF.

IN LEAST TIME

With Least Effort will qualify for Code Exam, Ham or Commercial — any grade

METHODS $5 each or SET (3) one order $10. Money Order — C.O.D. and Postage in United States if remit One Dollar.

C. K. DODGE

Box 100 Mamaroneck, N. Y.

PACENT

Duo Lateral

COILS

The complete line of all standard turn ratios preferred by leading laboratories and engineers.

Write for information and prices

PACENT ELECTRIC CO., Inc.

91-7th Avenue New York City

All You Need to Learn TELEGRAPHY Morse or Continental with Teleplex

Learn Telegraphy — the world's most fascinating profession — by hearing real messages — sending them. Interesting — simple — you learn quickly — at HOME.
Teleplex is the Master Teacher. Used by U. S. Army, Navy and leading radio and telegraph Schools. *Write for Folder Q-6.*

TELEPLEX COMPANY
76 Cortlandt Street, New York

amateurs who have worked some part of the British Empire in each Continent. (Note North and South America count as one continent.)

Arrangements are being made to interest the Boy Scouts of the world in amateur radio; a scheme has been prepared whereby our members form pivotal stations for training purposes. Any suggestions from overseas will be appreciated.

The B.E.R.U. continues to extend and if present plans mature an All Red Empire Route will shortly be in operation for the passage of experimental messages, and we dare to hope later, the passage of loyal greetings to our Patron — H.R.H. The Prince of Wales.

To the many overseas amateurs who read these notes we would emphasize that we are at all times pleased to receive applications for membership into R.S.G.B. or B.E.R.U. and we shall be glad to forward to all such interested persons a copy of our monthly bulletin. Our address is 53 Victoria Street, London, S.W.1.

—- - - —

GERMAN NOTES

By Dr. Curt Lamm, D4AFA.

It is with the greatest pleasure that we are able to report that amateurs in Austria are to get their licenses without further delay. Up to now, the following are officially licensed: UO1JZ, UO1TN, UO1JF, UO1JN, UO6GR. Some more are to follow shortly. On this occasion, the territory of Austria has been divided into different districts, which will be numbered subsequently. A detailed report on this will follow in our next report.

D4UAH, Victor Gramiah of Munich, has succeeded in establishing contact with W2BG on 28 mc. QRK mutually varied from R3–R7. D4UAH was using 15 watts.

During the last period covered by this report, conditions on 14 mc. seemed very favorable. Many of the D's hooked up during evening hours with our fellow amateurs in the United States, amongst them D4CC, D4XN, D4ADF. In daylight good conditions for VK and ZL traffic were observed, and D4XN established many QSO's with that part of the globe.

On "40" conditions were fair in early February. D4AEZ of Staaken near Berlin reports much DX, and D4GJ of Beuthen got in touch with SU8WY on 1.5 watts. QRK R5.

A few OM's were busy on 3.5 mc. among them D4KZA of Berlin, D4ABV of Breslau and HB9MQ in Northern Switzerland. We hope that some more stations will QSY to 3.5 mc. in order to reduce QRM on 7 mc.

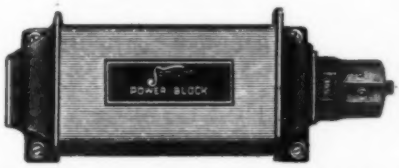
—- - - —

DUTCH NOTES

By H. Pomes, Assistant Traffic Manager, N.V.I.R.

On the 3500-kc. band European communication increases and many hams seem to find out all over again that this narrow channel can be used

SAMSON POWER BLOCKS
No. 713



DELIVERS 180 VOLTS D. C. CURRENT AT 120 MILLS

In addition supplies Filament Current for UX-280 and two UX 171 A Tubes. Also contains two chokes. All being necessary to build up a power pack is Filter Condensers and Resistors.

Operates on 110 Volts, 60 Cycle A. C. current. Rated at 30 Watts

List $25.50 **SPECIAL $6.50**

RCA Double Filter Chokes

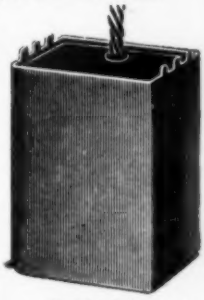
Contains two 30 henry 80 Mill Chokes

This heavy duty, rugged, double Filter Choke is excellent for all types of filter circuits and experimental work in receiving sets, power amplifiers, eliminators, transmitters and various other purposes.

Made by General Electric Company for Radio Corporation of America, and is RCA Replacement Part No. 8336 for the Radiola 33, 18 and 17.

Each Choke has a 1000 Volt insulation test and the D.C. resistance is 500 Ohms.

When connected in parallel these double Filter Chokes have a capacity of 30 Henries at 160 Mills, and when connected in series have 60 Henries at 80 Mills.



Weight 6 lbs.
Size: 5¼ x 3¾ x 2⅛"
List Price: $10.05

Fully shielded in metal case with special insulating compound. Made of the best parts, including the highest grade of silicon steel.

SPECIAL $2.50

THORDARSON High Voltage Power Transformers

For UX-250 or 210 and UX-281 tubes

250 Watts

This Thordarson Power Transformer delivers A, B and C current to two UX-250 or 210 Power tubes and "B" current to a Receiver.

Delivers full wave rectification using two UX-281 Rectifying tubes. Has two 7.5 Volt Center-Tapped Filament Windings for the two UX-250 or 210 Power tubes and also two 7.5 Center-Tapped Filament Windings for two UX-281 Rectifying tubes.

The A. C. Voltage Plate Winding is 1200 Volts Center-Tapped at approximately 150 Milliamperes.

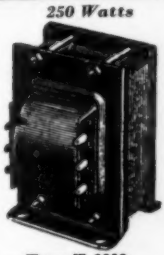
There is also a 3 Volt Center-Tapped Filament Winding on this Transformer which can be used if desired with 2½ Volt tubes by means of a resistance.

The primary of this Transformer is designed for use on 50–60 Cycles AC current and has taps for line variations from 100 to 125 volts.

This large, rugged, heavy duty Power Transformer has been tested at 2500 Volts.

Ideal for Transmitters, Power Amplifiers, Receivers, etc.

SPECIAL $5.75



Type T-3202.
Size: 6" x 4½" x 3¾".
Weight: 11 lbs.
List Price: $20.00

POTTER HIGH VOLTAGE CONDENSERS

13 MFD. D. C. WORKING VOLTAGE 600 V.

Type 1603-A.
Size: 6⅛" x 4½" x 4".
List Price: $20.00

Tapped at 4.4. — 4. — 1. Mfd. An excellent Filter Condenser for use in Transmitters, Power Amplifiers, etc.

SPECIAL $4.50

DUBILIER FILTER CONDENSERS, Type P. L. 571 — 4 mfd. 600 Volt D. C. Working Voltage. List $12.00	**Special $2.25**
THORDARSON DOUBLE FILTER CHOKES. Type T 2458. Each choke 18 Henries — 250 Mills. List $19.50	**$6.25**
WESTERN ELECTRIC MICROPHONES. Breast Type (without straps)	**$1.25**
SAMSON 3000 Ohms Double Head Sets. List $8.00	**$2.50**
FILTER CHOKES. 30 Henries—120 Mills, D. C. resistance 400 Ohms. mfd. by Chicago Transformer Corporation	**$2.25**

THORDARSON High Voltage Power Transformers

For UX-250 or 210 and UX-281 tubes.

175 Watts

This Thordarson Power Transformer delivers A, B and C current to one UX-250 or 210 Power tube and B current to a Receiver.

Delivers full wave rectification using two UX-281 Rectifying tubes. Has a 7.5 Volt Center-Tapped Filament Winding for one UX-250 or 210 Power tube and a 7.5 Volt Center-Tapped Filament Winding for two UX-281 Rectifying tubes.

The A. C. Voltage Plate Winding is 1125 Volt Center-Tapped at approximately 125 Milliamperes.

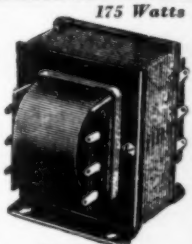
There is also a 3 Volt Center-tapped Filament Winding on this Transformer which can be used if desired with 2½ Volt tubes by means of a resistance.

The primary of this Transformer is designed for use on 50 to 60 Cycles AC current and has taps for line variations from 100 to 125 Volts.

This large, rugged, heavy duty Power Transformer has been tested at 2500 Volts.

Ideal for Transmitters, Power Amplifiers, Receivers, etc.

SPECIAL: $4.50



Type T-3321.
Size: 4½" x 4" x 3 13/16".
Weight: 8¼ lbs.
List Price: $18.00

AMERICAN SALES CO., 19-21 Warren Street, New York City

BANKRUPT RADIO STOCKS

FULLY GUARANTEED

Tubes UX type, 30 day replacement guarantee, No. 210, $2.25; No. 250, $2.35; No. 281, $1.85; No. 280, 95c; No. 245, $1.25; No. 224, $1.25; No. 227, 75c; No. 226, 65c; No. 171, 75c.

Low Power Transmitter, adaptable for phone or code. With plug-in Coils.....$14.75

Short Wave Sets, one tube complete with 5 coils, 14 to 550 meters.....$6.45

B Eliminator, Dry, 180 volts, will operate up to 10 tube set, with 280 tube, fully guaranteed.....$6.75

250 or 245 Power Condenser Blocks, 12 Mfd., 1000 volt A. C. test, tapped 2,2,2,4,1 and 1 mfd.....$4.75

2 Mfd. Condenser Packs, 2000 volt A. C. test $7.90
1500 volt.....$3.80

Double Chokes, 30 henry each, 160 mils., 1500 vt. test, shielded.....$4.95
130 mils.....$3.75

A. C. Power Filament and Choke Pack.....$4.00

No. 1003 Power Transformers, shielded, Sec. 600 V. for one 281, one 250, one 227, four 226 tubes and 2 chokes.....$5.00

A. B. C. Power Packs, completely assembled, $8.75. 250 V. B. also has A. C. filament for up to 9-tube set. Can be used as B eliminator. Make your battery set all electric, or build your A. C. set around this pack. 280 tube for this pack, 95c extra.

Thordarson Transformers, 1 to 1.....$1.00

CHAS. HOODWIN CO.

4240 Lincoln Ave., Dept. F-8, Chicago, Ill.

DEALERS IN BANKRUPT RADIO STOCKS

It's EASY to Get a HANDBOOK

(Sixth Edition)

DIRECTIONS:

Realizing that Handbook must be had, proceed as follows:

(1) **Fill out below, tear off.**

(2) **Reach in pocket, produce U. S. A. $1 bill, old or new size (we don't care).**

(3) **Clip together, mail us.**

Handbook Factory,
1711 Park, Hartford.

SEND IT AT ONCE.

_____
(Name)

_____
(Street or P. O. Box)

_____
(City and State)

for both 'phone and code work with low power at relative big distances.

On 7000 kc. good continental communication was possible during daylight, but with many 'phone stations it is the old story. After sunset only a few stations may be heard and no good QSO's were made. Only on March 7, 8, 9, 10, were fine DX stations heard, and these were in many cases worked.

The 14,000-kc. band offered many occasions for working all continents, especially on the dates mentioned above; on other days no stations could be logged after sunset. Usually VK and ZL may be heard early in the morning; after 1400 G.C.T. many stations in Asia were worked; from 1700 to 1900 G.C.T. South African stations come in FB. Then, under favorable conditions, American stations are very loud till midnight. We can state with great certainty that a western wind and higher temperature bring in more stations during the night than an eastern wind together with a lower temperature.

PA0DW still belongs to our star stations and worked all continents several times.

From the 28,000-kc. band we can only report that a few American stations were logged during the tests organized by the R.S.G.B.

Our annual meeting was held on March 16th in Utrecht. A new committee was elected. Our new President is Mr. J. Corver, one of the outstanding figures in Dutch amateur radio. Further, a beginning was made with coöperation between the N.V.V.R., the oldest radio society in our country, and the N.V.I.R., the Dutch I.A.R.U. Section. When a final solution of this problem shall have been effected, we shall announce it in these notes.

Of course, the day was ended in a real hamfest; the greater part of the Dutch hams had dinner together, and proved that Old Father Ham Spirit has many children among them!

NORWEGIAN SECTION

By G. H. Petersen, LA1D

During March most Norwegian hams have been active with European contacts, and generally report fair conditions. There seems to be a tendency to make medium-distance rag-chewing contacts on very low power in preference to DX-hunting.

LA1G reports, however, ZL and VK fine 0700–0830 G.C.T., and W, ZS, ZT, 1700–2000 and has done a lot of work on 14 mc.

LA2K is using a portable 3-watt transmitter on week end trips signing XLZ2K, and would welcome reports.

LA1J, our most active Bergen station, working on 14 mc. is mighty proud of having QSO'ed the fair and famous SP3YL, having even been promised her photo! He reports very variable conditions.

At headquarters we are preparing for the general meeting which is to be held in Oslo early in August. We expect a good representation of active Norwegian hams, and any foreign OM who may

A BETTER FILTER

FOR HIGH VOLTAGES

AT LESS COST

The Amrad Mershon Electrolytic Condenser can well form the basis for an unusually effective and economical High-Voltage Filter Circuit for your Short Wave Transmitter.

In the past few years, more than 3,000,000 of these condensers have been incorporated in the Radio Receivers of Thirty-one Prominent Manufacturers.

These features of the Amrad Mershon Condenser commend themselves particularly to builders of high-voltage power supplies for short wave transmitters.

Self Healing — Not injured by high-voltage surges.
High Capacity — Up to 72 Mfds. in a single unit.
Needs No Attention — Can be forgotten, once installed.
Long Life — Guaranteed for One Year — will last many.
Does Not Create Heavy Charging Surges.
Will Absorb Unusual Keying Surges.
Costs Less than the Ordinary Condenser — of same voltage rating and capacity.

THE AMRAD MERSHON FILTER CONDENSER IS MANUFACTURED ONLY BY THE AMRAD CORPORATION

Send the coupon for detailed information showing how you can use the Amrad Mershon Filter Condenser in your transmitter.

THE AMRAD CORPORATION

Medford Hillside, Massachusetts

The Amrad Corporation
210 College Ave.
Medford Hillside, Mass.

Please send me detailed information regarding the use of the Amrad Mershon Condenser in filter circuits.

Attached is a diagram of the equipment with which I wish to use it.

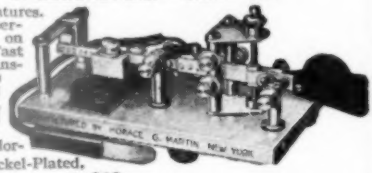
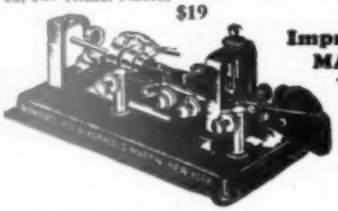
NAME.....

ADDRESS.....

.....

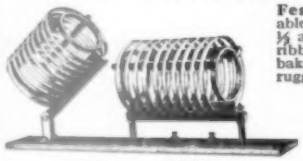
CITY.....

STATE.....

The NEW Easy-Working
GENUINE MARTIN
VIBROPLEX No. 6
Reg. Trade Marks: Vibroplex; Bug; Lightning Bug
IN COLORS: *Blue — Green — Red*
10 New features. Easy to operate. Easy on the arm. Fast or slow. Transmits signals unequalled for *strength, clarity* and *beauty*.
Black or Colored, $17 Nickel-Plated, $19


Improved MARTIN Vibroplex
Black or Colored, $17
Nickel-Plated, $19
Special Martin Radio Bug — Extra large, Specially Constructed Contact Points for direct use without relay. Black or Colored. $25
Your old Vibroplex accepted as part payment
Remit by Money Order or Registered Mail
THE VIBROPLEX COMPANY, Inc.
825 Broadway, New York City
Cable Address: "VIBROPLEX" New York

Graduate from the Mediocre Class
Take first honors with a prize station backed by that most powerful of all rectifiers — THE MERCURY ARC. Most miles per dollar, cheapest to operate and replace. Filamentless. No falling off in output during long life. Heavy duty single and polyphase transformers for 866, 872 and arc duty. Filter and interphase reactors 500% more efficient than brute force.
Your station a sure winner — Here's How
RECTIFIER ENGINEERING SERVICE
W8ML 4837 Rockwood Rd. Cleveland, Ohio

We have seven (7) complete sets (two books, each containing six issues, to a set) of the 1926 series (volume X) of QST. They are specially priced at $4.00 per set, postpaid. They will go very quickly!

TRANSMITTING COILS

Features— Interchangeable 20–40–80 meter bands; ⅜ and ¼ in. wide heavy ribbon wound on grooved bakelite framework; very rugged! Distributed capacity of these coils very low!
Ideal for Fone, MOPA or Xtal circuits.
GRID COIL and mounting . . . $4.50
Extra coils each 3.50
Price $7.50
State Band Wanted When Ordering and whether for High-C. Will Ship C.O.D. if $1.00 enclosed with order
Arthur L. Munzig
RADIO MANUFACTURER
W6BY REDLANDS, CALIFORNIA

visit our town during these days will be heartily welcomed to our hamfest.

PORTUGAL

We are very glad to learn from Eugenio de Avillez, CT1BE, that the Rede dos Emissores Portugueses has been recognized by the Portuguese government as representing the amateurs of Portugal, and has received an invitation to nominate one of its members for membership in the council of T.S.F. It will be recalled that this active amateur organization is to be voted upon in the June Calendar of the I.A.R.U. for affiliation with the Union.

It is gratifying to note this triumph, and we extend our congratulations and best wishes for the future.

The WAC list is being held over until next month.

Getting that D.C. Plate Supply

(*Continued from page 16*)

Rectifiers, Hot-Cathode Mercury-Vapor

Electrolytic Condensers and a High Voltage Rectifier, page 31, March '30.
A New Type of Rectifier Tube for Amateur Use, page 21, February '29.

Rectifiers, Mercury-Arc

Three Phase High-Voltage Rectifier, page 37, February '30.
Mercury Arc Rectifiers, page 8, August '26.
Mercury Arc Rectifiers, page 21, January '25.

Filters

ABC of Filter Design, page 34, April '30.
Electrolytic Condensers and a High-Voltage Rectifier, page 31, March '30.
Plate Supply Filters and Keying, page 39, January '30.
The Filter Business, page 66, March '29.
Filter Circuits, page 43, August '28.
*Notes on Filter Circuit Design, page 27, July '28.
Picking the Right Filter Condenser, page 37, October '28.
*Final Capacity in Two-Section Filter, page 36, February '28.
*Middle Capacity in Two-Section Filter, page 27, May '28.
*The First Filter Condenser, page 33, September '27.
Electrolytic Filter Condenser, page 55, April '27.
Ford Coil Filter, page 67, April '27.
Ford Coil Filters, page 43, March '26.
Amateur Filter Problems, page 24, December '25.
Rectifiers and Filters, page 29, February '25.
Smoothing Circuits for Half-Wave Rectification, page 33, August '25.
D.C. Filters, page 52, September '25.
Filters and the Motor Generator, page 64, December '25.
Mercury Arc Rectifiers, page 21, January '25.
Radio Amateur's Handbook, Chapter VII.

SM You Don't Need a Can Opener to Spread the Ham Bands on the "Bearcat"!

Throw away your jig-saw, your bolt-cutter and the little hatchet! Using the set as is, you can spread the crowded ham bands all over the dial by a twist of the wrist on the new S-M 737 Shortwave Bearcat.

Nothing up the "Bearcat's" sleeve, either—it's a little midget condenser, built right in, that does the job. And that isn't all—there's a *built-in* power supply, *one-dial* tuning, a *real* gang condenser and a screen-grid circuit with *two s. g. tubes!*

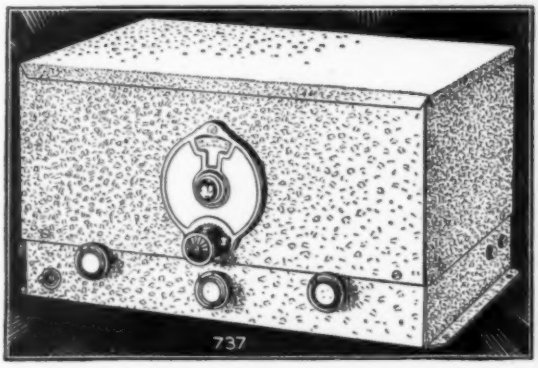
There is no longer any reason for not having a short-wave set comparable to a broadcast receiver.

Yet there's nothing on the 737 just because it's "pretty." Perfect battleship shielding—that's the starting point. Then there are two double-shielded tuned circuits, a regenerative non-radiating detector, and a powerful '45 second audio stage. Eight specially designed plug-in coils (included in list price) cover from 16.6 to 200 meters—all foreign and American short-wave broadcasting as well as the ham bands. Four extra coils ($5.50 *list*) cover the American broadcast band.

Treat yourself to the best—if there's any chance of getting Prague, you'll do it with a "Bearcat."

And it *isn't* expensive—complete with *built-in power supply*, wired, licensed, in cabinet as illustrated, the list price is only $139.60, subject to usual trade discount.

Which means 737's are going to be as scarce as "Dodos" for a long time to come! *Better get your order in to your jobber now.*



S-M 737 Short-Wave "Bearcat"

A *Real* Auto Receiver!

The new S-M 770 "Playfellow" is an auto receiver that's built not only to stand the gaff but to give real "console model" reception.

It's small (12" long by 7½" high and 6¼" deep), sensitive (5 microvolts per meter), screen-grid (*three* s. g. tubes including detector), and has a standard S-M 810 illuminated drum-dial—a pocket edition of the finest receiver, specially designed for its job.

There's no cutting of cowl or instrument panel to install it. It is readily attached to the car bulkhead under the cowl to the right of the driver's seat.

Only tests can prove an auto receiver—and the "Playfellow" has consistently brought in distant programs over test runs made on hundreds of miles of rough, back-country roads.

Priced complete, except for tubes and speakers, $79.50, *List*. Parts are standard. Priced at $61.40 *List*.

S-M 870 Automotive-Magnetic Speaker (9⅝" square and only 4½" deep) gives the maximum output of a '71A tube. *List* price, $15.00.

771 Auto Receiver accessories include all necessary installation equipment except tubes and batteries. *List* price, $16.50.

The Radiobuilder, Silver-Marshall's publication telling the very latest developments of the laboratories, is too valuable for any setbuilder to be without. Send the coupon for a free sample copy. If you want it regularly, enclose 50c for next 12 issues.

4,000 Authorized S-M Service Stations are being operated. Write for information on the franchise.

SILVER-MARSHALL, Inc., 6409 WEST 65TH ST. CHICAGO, U. S. A.

Silver-Marshall, Inc.
6409 West 65th St., Chicago, U. S. A.

.... Send your latest catalog, with sample copy of the Radiobuilder.

.... 4c enclosed; send Data Sheets on 737 and 770.

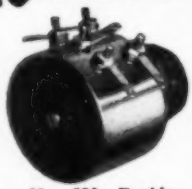
.... 10c enclosed; send five new S-M Data Sheets (including the 737).

Name.....

Address.....

FROST-RADIO

We are equipped to produce Frost Radio Volume Controls in either wire wound or carbon element type, clockwise or counter-clockwise knob rotation, and with absolute accuracy in all resistance gradations from 5 ohms to 1 megohm. Our service is unique, speedy and satisfying. Ask us to submit samples based on your particular specifications.



No. 890. Double depth metal shell unit in rheostat or potentiometer type. Rotors in same electrical connection. Composition elements, 5,000 ohms to 1 megohm in each unit. Diameter, 1 7/8 in. Depth of shell, 1 3/16 in.

HERBERT H. FROST, Inc.

Main Office and Factory: ELKHART, IND.

HERBERT H. FROST, Inc.
160 North LaSalle Street, Chicago Q.S.T. 6-30

Send me your Parts Catalog by return mail. I understand that it will be sent to me FREE and postpaid.

Name.....

Address.....

City..... State.....

TRANSMISSION CONDENSERS

Cornell

Send for interesting data and price sheet on Transmission Condensers with working voltages up to 3000 D.C. for use with the following tubes: 203A, 204A, 210, 500W, 851, 852, 860, 865.

CORNELL ELECTRIC MFG. CO.
Long Island City New York

Massachusetts Radio and Telegraph School

18 Boylston Street, Boston
Send for Catalogue

Tel. Hancock 8184 *Established 1905*

POWER SUPPLY SYSTEMS

BUILT FOR YOUR NEEDS

Inform us as to your needs and we will forward our estimate.

A Short Wave Calibrated
Wavemeter — range 17 to 200 meters.....$12.50

Audio Oscillator
Range 40 to 5000 cycles.....$17.50

Send for our information sheet on the two items above.

Short Wave Receiving and Transmitting apparatus built to order to your exact specifications.

WIRELESS EGERT ENGINEERING, INC.
179 Greenwich Street New York City

Advanced Transmitter Design

(Continued from page 28)

under the circuit conditions in this transmitter but no promise is offered that they might be satisfactory with tube capacities in shunt (in parallel-feed circuits).

Chokes are shown in the key leads as well as in the d.c. grid and plate-feed circuits. The leads to the key happened to be of the right length to pick up some r.f. in the electric field about the transmitter but the chokes knocked it out of the keying circuit very effectively. If there is no evidence of r.f. in the keying circuit, these chokes may be omitted. Incidentally, a frequency meter (tuned to the frequency of the transmitter) with a flashlight bulb as an indicator makes a handy gadget for hunting out r.f. in the various circuits where there isn't supposed to be any r.f. If the bulb glows when the coil is held near the suspected lead there is r.f. flowing in that circuit.

A condenser to minimize sparking at the key contacts is connected across the key-jack in the transmitter. It is an old Faradon UC-1015 with the three sections connected in parallel to give a capacity of .0012 μfd. A better arrangement would be one of the key-thump filters described in the Handbook; a 0.5-μfd. condenser with a resistor of several hundred ohms in series, connected across the key, should be more effective. If bothersome key-clicks turn up, use your favorite thump eliminator — just as on any other transmitter.

All connections in r.f. circuits (indicated by the heavy lines in Fig. 4) are made with copper tubing excepting the stranded grid and plate leads from the Type '52 tubes. The copper tubing is ¼-inch in diameter except the ⅛-inch tubing connecting the grid coil to the grid tuning condenser. Other connections are made with No. 14 stranded with rubber insulation and No. 14 bare bus-wire. The filament- and plate-supply connections are made to binding posts on a terminal strip at the back. The open-circuit jack for connecting the key is also mounted on this terminal strip.

The tuning of the transmitter is exactly like that of any other tuned-grid tuned-plate outfit, and the same procedure should be followed. The best operating adjustment will be that at which the grid tuning condenser is set at a slightly higher capacity than the one which gives minimum plate current. The tuning of t.g.t.p. transmitters is exceptionally well analyzed in H. A. Robinson's article "Operating Characteristics of Vacuum Tube Oscillators," in November, 1929, *QST*. (Kilocycles to meters that half the gang didn't read the story because it looked "too technical" — and passed up an opportunity to find out just what makes a t.g.t.p. transmitter tick.)

As with any self-excited transmitter, the antenna-coupling circuit should be tuned to a frequency slightly lower than that of the transmitter, the antenna current being about 20% less than the maximum obtainable. The monitor should be used always as what George Grammer calls the "final authority," and the transmitter

A SAFE GUIDE

in the selection of insulation for Radio Transmitting and Receiving Sets

OVER 300 broadcasting stations, leading radio telegraph systems, the United States Army, Navy, Air Mail, Coast Guard and Ice Patrol Services, explorers like Commander Byrd, and exacting amateurs everywhere have utilized PYREX Insulators in many spectacular achievements.

Regardless of whether you are sending or receiving — on land, sea or airplane — you should be thoroughly familiar with the PYREX Antenna, Strain, Entering, Stand-off and Bus-bar Insulators that are helping these leaders to make radio history.

The new PYREX Radio Insulator booklet lists all types and sizes with data that you will want for ready reference.

Return the coupon for your copy, and if you want further advice on any insulation problem, our Technical Staff will answer your questions promptly.

Send the coupon for your copy

CORNING GLASS WORKS
Corning, N. Y.

Gentlemen:

Please send me copy of your new bulletin on Radio Insulators.

Name

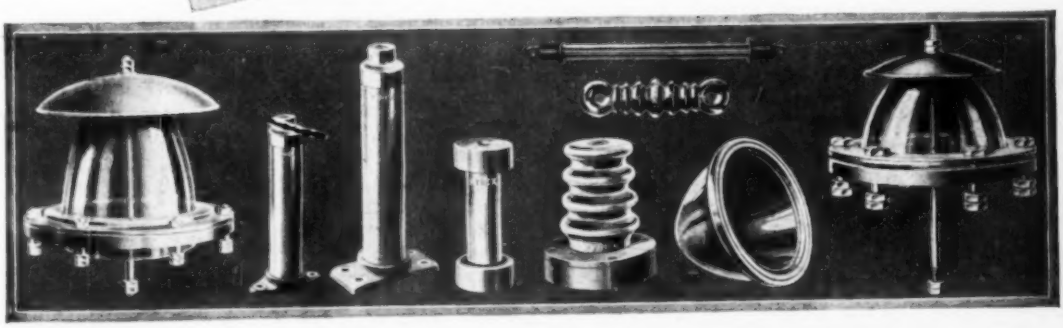
.....

Address

.....

.....

QST 6-30



Reduced Prices On
Oscillating Quartz Crystals

POWERTYPE CRYSTALS

For Commercial Stations
For Dealers
For Amateurs

POWERTYPE CRYSTALS ARE RECOGNIZED AS THE BEST

Guaranteed — easy oscillators, carefully selected for maximum output, and ground to your approximate frequency which is stated accurately to within one-tenth of one percent.

1715–2000 Kilocycle band	$10.00
3500–4000 Kilocycle band	15.00
One-inch oscillating blanks	4.00
Dustproof, plug-in Crystal Holders	6.00

We also supply "POWERTYPE" crystals to broadcast and commercial stations.

With all crystal blanks we furnish grinding instructions.

FREE Simply send name, no obligation, for full information on crystals, holders, blanks, heater ovens, etc.

"CLEAR AS A CRYSTAL"
American Piezo Supply Company
1101 Huron Building Kansas City, Kansas
Specialists in frequency precision

TRANSFORMERS
Guaranteed — Mounted — Complete

2 kw 2000—2500 each side	$40.00
700 watt 1000—1500 each side	14.50

250 watt 500—750—1000 each side unmounted $9.75; mounted $11.50
Auto-Transformers, Chokes, Polyphase and 25-cycle Transformers. Add $2.00 for fil. winding
W9CES FRANK GREBEN
1927 So. Peoria Street, Pilsen Sta. Chicago, Ill.

Do you know that the latest Handy and Hull Handbook is available in bound form — $2.00 per copy, postpaid.

When ordering a copy of this new sixth edition, look at your present copy and determine if you want your next copy in more permanent form.

Built for the Quality-Minded
Experienced "hams" — who put quality performance ahead of price — invariably choose ELECTRAD Resistances and Voltage Controls.
Write Dept. Q6 for literature describing all ELECTRAD PRODUCTS.
175 Varick St., New York, N.Y.
ELECTRAD INC.

BECOME A RADIO OPERATOR
See the World, Earn a Good Income, Duties Light and Fascinating
LEARN IN THE SECOND PORT U.S.A.

Radio Inspector located here. New Orleans supplies operators for the various Gulf ports. Most logical location in the U. S. A. to come to for training.
Our students qualify for the various branches of radio Runs to all parts of the world. Positions Ashore and Afloat.
Special courses. Day and Night classes. Enroll any time.
Oldest and Largest Radio School South.

Literature on request.

GULF RADIO SCHOOL
844 Howard Ave. New Orleans, La.

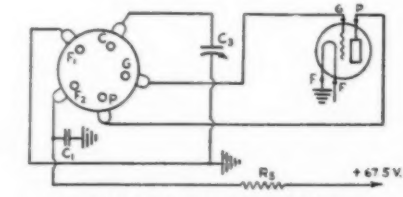
should never be put on the air without first checking the note and the frequency.

Fig. 5 is a suggested arrangement of the same type transmitter for Type '10 tubes. How about some of the gang building one up and letting us know how it perks? We can't build all the new rigs here at HQ, you know!

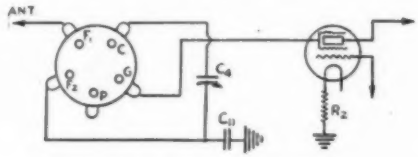
The Bandbox Superhet

(*Continued from page 30*)

screw-driver from a piece of round fiber or wooden dowel (do not use metal) to fit the screw heads on the neutralizing condensers.



OSCILLATOR COIL SOCKET CONNECTIONS



DETECTOR COIL SOCKET CONNECTIONS

FIG. 3

Place No. 3 coil in the detector and No. 2 oscillator coil in the oscillator. Turn on the set and adjust detector and oscillator tuning condensers for maximum volume, with the volume control turned up about half way. Now take the fiber screw driver and adjust all three neutralizing condensers to maximum volume. Be sure the c.w. switch is off while doing this. If you find that you can hear a broadcast station all over the oscillator dial, readjust the neutralizing condensers again after loosening them up about one full turn. When the i.f. stages are tuned to resonance, tune in some short wave broadcast station such as W2XE and make the final adjustment of r.f. tuning. Always remember that when you change the i.f. condensers you throw off the dial settings on the oscillator tuning condenser because you change the intermediate frequency.

There is not much more to say about this set. As to results, it will operate a loudspeaker on any short wave 'phone station being heard in this country and I am sure that anyone who builds this type of super will never be sorry for the time and money spent. I have been a radio amateur and set builder for 15 years and have used all kinds of sets but have never had one that would duplicate the performance of the Bandbox Superhet.

The Most Amazing Radio Value Ever Offered!!!

A NEW Screen Grid, Neutrodyne Circuit, Power Speaker, A.C. Electric, Low Utility Console Model at an Unheard of Low Price!!!

The eagerness with which the public has accepted the new CROSLEY BUDDY and other models of the "Companionship" Series is conclusive proof that low utility cabinet sets are wanted! The reception accorded the BUDDY shows that there is an immense market for a low priced, reliable, Screen Grid, Neutrodyne, power speaker, A. C. electric receiving set. Many who could not afford higher priced sets welcome the BUDDY as a reliable means of enjoying radio. Others find it an economical way to provide several sets for radio reception in different rooms of the home. Get in touch with your Crosley distributor today. Get your share of the profitable business created by the amazing BUDDY model and its associate models in the new Crosley "Companionship" Series.

As an End Table
the BUDDY serves as a convenient resting place for books, magazines, ash tray, etc.

As a Bedside Table
the BUDDY provides ample space for night light, a book or two, telephone, etc.

In the Dining Room
the BUDDY provides entertainment and amusement and serves as a temporary resting place for many things.

The BUDDY

$55.00 LESS TUBES

This handsome BUDDY model has a metal case with panels in beautiful burl walnut finish. The trim is silver and ebony inlay effect. The legs as shown are standard equipment.

An improved CROSLEY Dyna-cone power speaker is included at the price, and is installed under the cabinet. Uses six tubes, two Screen Grid No. -24, one No. -27 as a bias-type power detector feeding into two No. -71As connected push-pull, and a No. -80 rectifier tube. Has built-in power supply unit incorporating genuine trouble-free Mershon condenser.

Only 24¼" high, 17¾" long, 11¼" deep

Western Price Slightly Higher

New Low Price

As Occasional Table
the BUDDY will become a real companion providing space for nut bowl, candy dish, etc.

In the Library
the BUDDY will enhance the enjoyment of any book by providing smoking materials at finger tips.

In the Kitchen
the BUDDY brings in cooking and baking lectures and provides a place for note book in which to jot down recipes.

The Crosley Radio Corporation

POWEL CROSLEY, JR., *President* CINCINNATI, OHIO

Home of WLW—*"the Nation's Station"*

YOU'RE *THERE* WITH A CROSLEY

CROSLEY RADIO

ALUMINUM SHIELDS

BEAUTIFUL SILVER DIP FINISH
Genuine ALCOA Stock
5 x 9 x 6, $1.89 — 14 x 6 x 6, $3.95
Any size to order in 24 hours.

ALUMINUM COIL SHIELDS
3½ x 6½ straight, 49c
3½ x 4¼, 60c — 3 x 4¼, 55c
Sand blast or polish, 20c extra

ALUMINUM TUBE SHIELDS
2½ x 4½ straight
2½ x 2 Hole cover
1¾ x 4¼, inc. base
2 x 4¼, inc. base
} 48c

TEST LEADS, Genuine RADION sleeves over No. 18 wire. Tips or fork lugs on other end. 20" long 69c pair, 36" long 79c pair. Just the thing for meters and other uses.

Insulating washers for binding posts on metal, 15 for 10c.

Insulated tip jacks, 12c.

Dubilier Condenser .01 or .015, 34c.

Insulated coupling or shaft extension, 33c.

G. R. type stand-off insulators, 4 colors, 17c.

X-L variodensers model "N", 29c.

115 up-to-date set diagrams, 8½ x 11 loose leaf perforated, $2.50.

Please include postage

BLAN, THE RADIO MAN, INC.
89Y Cortlandt Street — New York City

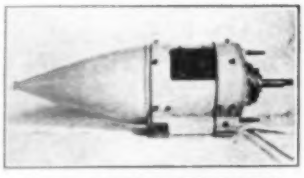
QUARTZ OSCILLATING CRYSTALS

Scientifically Prepared for Maximum Power and Unconditionally Guaranteed
1 in. square sections, (*within ½ of 1% of your specified frequency*), supplied *promptly* at the following prices:

75-100 meters	$12.50
100-200 meters	10.00
200-600 meters	15.00
1 in. Tested blanks, 200-400, 400-600 meters	5.00
Dustproof Bakelite mounts	3.00

(An accurate Calibration furnished with each crystal)
Sections of any practicable dimensions made to order
(Charges for grinding to exact frequencies given on request)

J. T. Rooney, B. Sc., 4 Calumet Bldg., Buffalo, New York
"Fifteen years' crystallographic experience"
"A pioneer crystal grinder"



U. S. NAVY SURPLUS

500-watt 500-cycle ball-bearing generators with exciters. Very special $7.50
500-watt 500-cycle transformers, easily tapped for any voltage $7.50
General Electric 24/750 150-watt dynamotors 27.50
General Electric 24/1500-volt 350-watt dynamotors $37.50
Shafts for external drive $3.00 additional
HENRY KIENZLE, 501 E. 84th Street, New York
Pioneer Distributor of Government Surplus

LEARN RADIO

in a school with a reputation for graduating competent men

Dormitory — Laboratory Workshop

SUBJECTS TAUGHT

Commercial Radio — Radio Service
Radio Broadcast — Navigation
Radio Mathematics — Laboratory
Vitaphone — Movietone

Enroll now for Fall Term beginning September 29th
Write for further information

COMMERCIAL RADIO INSTITUTE
38 W. BIDDLE ST. FOUNDED 1920 BALTIMORE, MD.

Angus Elected Central Division Director

IN a special election just held, the Central Division has chosen Mr. D. J. Angus, W9CYQ of Indianapolis, as its Director for the unexpired remainder of the term of the late Mr. Clyde E. Darr. The term ends January 1, 1931. Voting was as follows:

Angus, D. J.	876 votes
Prazak, R. T.	74 "
Sellers, R. C.	66 "
Spiller, A. G.	228 "
Stark, C. S	119 "
Wise, Dallas	166 "

Mr. Angus' amateur experience extends back some fifteen years, well before the war. He is our Section Communications Manager for Indiana, past President of the Indianapolis Engineers Club, a Lieutenant-Commander in the U. S. Naval Reserve, and a member of the A. I. E. E. A business man of mature years, he is treasurer and chief engineer of the Esterline-Angus Co., in which capacity he has done much traveling that has brought him in contact with amateurs and clubs around his division. The Central Division is to be congratulated upon its choice.

Strays

W3CJ finds that his spare receiver coils are handy for shifting dead spots on his tuner. The coils are wound on tube bases, and an extra socket is connected in the antenna lead so that when a spare coil is plugged in it, it acts as a loading coil, thus shifting the resonance point of the antenna.

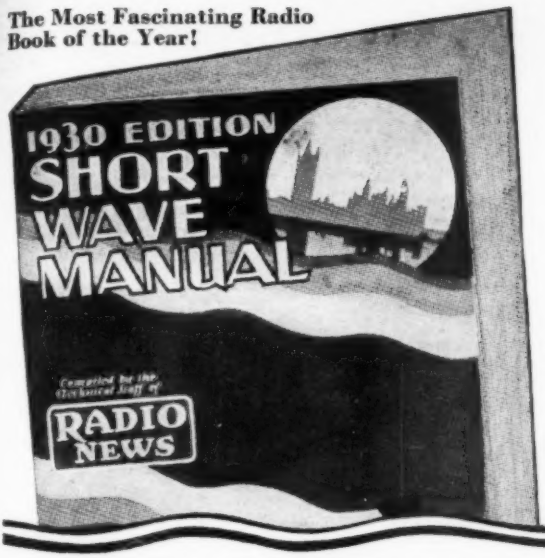
W9CBK has a tuning condenser with plug-in rotor plates, while W8DXG puts the stator plates on plugs. The only thing we lack is a coil with plug-in turns or a tube with a plug-in filament.

From the March issue of *Factory and Industrial Management:* "An editor must have his mail. So when ours failed to put in an appearance the other morning, we were moved to find out why. We found out. Bill, the office boy, had overslept. Bill, we learned, is not only a radio fan, but a licensed operator as well, who sits up all night, most nights, accommodating the world with messages from Byrd and all that sort of thing. Has forgotten more about radio than most of us will ever know. There are lots of boys like Bill scattered around industrial plants these days. Radio owes them plenty. Are we going to stand idly by while the big fellows do their darnedest to crowd these young explorers off the air?"

Good-will of this sort is worth having. Nearly every amateur can do something to help build it.

W1ALJ thinks he should be awarded some sort of medal. He didn't drop a single nut or screw when building his new receiver!

The Most Fascinating Radio Book of the Year!



FREE with the NEW RADIO NEWS

This Big Illustrated Volume Containing All You Want to Know About SHORT WAVES!

BECAUSE you and thousands of other radio men want all the latest facts and developments on Short Wave receiving and transmitting, the Technical Staff of RADIO NEWS in collaboration with the foremost S-W authorities have especially prepared a complete, new, up-to-the-minute SHORT WAVE MANUAL for you.

Replete with illustrations, diagrams, charts and plans — crowded with chapters by Lieut. Wenstrom, Hertzberg, Marshall, Spangenberg, Benneweg and other experts — this volume represents the last word in authentic Short Wave data. You'll be fascinated with such features as: —

- Breaking into Amateur Transmitting
- S-W Transmitter for the Average Home and Purse
- A Portable S-W Transmitter and Multi-wave Receiver
- The A. C. Operated Super-Wasp
- Crystal-Controlled 200 Watt S-W Transmitter
- The Egert S-W Four
- Experiments on Ultra-High Frequencies
- S-W Stations of the World
- For Real Thrills Get Down in the Amateur Wave Bands

In short here's the book that describes, illustrates and explains everything about S-W's — that gives you the complete and latest data. And it's yours WITHOUT COST!

Why It's FREE!

RADIO NEWS has practically twice as many readers as any other radio magazine. But there are still a few of you radio men who don't realize what you are missing.

Do you know that, besides covering every other phase of Radio, RADIO NEWS publishes many exclusive S-W features every month. Every issue keeps you posted on the latest S-W receiving circuits, up-to-the-minute S-W Broadcast Call Lists, S-W Receiver and Transmitter Designs, News from the Amateurs, latest improvements in Portables, etc., etc. You absolutely need RADIO NEWS to keep abreast of all S-W developments.

Big Cash Saving — Gift FREE!

That's why, although we will sell thousands of these SHORT WAVE MANUALS for a substantial price, for a limited time you may have a copy ENTIRELY FREE as an inducement to try RADIO NEWS.

To introduce RADIO NEWS to you, we will send you the next Eleven Big Numbers almost a full year subscription for only $2 — and will ship you the new 1930 SHORT WAVE MANUAL, postpaid, *entirely FREE!* You save 75c on the newsstand price of RADIO NEWS and get this invaluable S-W volume WITHOUT COST! Risk nothing. Mail coupon TODAY!

FREE Send for Yours TODAY

The NEW RADIO NEWS, Dept. 312,
381 Fourth Avenue, New York, N. Y.

Gentlemen: Send me, ENTIRELY FREE, postpaid, the new 1930 SHORT WAVE MANUAL, and enter my subscription for the next Eleven Big Issues of RADIO NEWS at only $2 which I enclose (regular newsstand price $2.75). I understand you will cheerfully refund me $2 and I may keep the S-W MANUAL if I am not more than satisfied.

Name .....

Address .....

City and State .....

Are you a Serviceman ☐? Engineer ☐? Dealer ☐? Experimenter ☐?

You Can't Duplicate Guesses

The Audimeter An audibility gauge for the amateur. Do you always give the same R5? What about on two audio? What about during a noisy spell? This little panel-mounting Audimeter gives the right reading and the same one on two A.F. as on one tube, during QRM and QRN, and will repeat itself. You can't duplicate guesses. Invaluable during tests if decently accurate reports are to be made. It not only ends the guessing but it makes guesses absurd because the price is too low to justify anybody's being satisfied with a guess. Calibrated with 5 arbitrary points and with the half-points marked. Has a handsome aluminum dial, is single-hole mount and a pointer-knob gives the indications. Serves also as volume control. Get the story — for the guesser is going out of date in amateur radio. Write today or order. Price $2.80 to the amateur.

The Hy-7 L. W. Hatry's latest double-detection design. A six-tube receiver with three screen-grid tubes. The complete story on how to make it and why — 50c. Write for descriptive circular. Band spreading if you want it. A real short-wave set.

The Voltma High-resistance (1000 ohms per volt) voltmeter and any milliammeter range you want combined. Low price. 1500v. and 500 ma. combination $9.75. Name combination and get quotation or write for information.

Jewell, Weston, Cardwell, Electrad, Sangamo, Tobe, Thordarson, Yaxley, National, Frost, Pilot, Signal, Hammarlund, Clarostat, etc., at amateur prices. And we help — we answer questions.

Hatry & Young

119 Ann St. H Y Phone 5-2733

HARTFORD - CONNECTICUT - U.S.A.

THERES THE GREATEST RECTIFIER ON THE RADIO MARKET TO-DAY- AND IF A BETTER TUBE CAN BE MADE- THEN THE NATIONAL RADIO TUBE Co., MAKES IT...
THE WORLD

Say It with Recto Bulbs

Type R3 $10.00 Type R81 $7.00

NATIONAL RADIO TUBE CO.
3420-18TH ST. S.F.

Dealers

CHI-RAD, CHICAGO LEEDS, N. Y.
HENRY'S RADIO SHOP, BUTLER, MO.

Doings at Headquarters

SOME changes have been made in the personnel at headquarters since the last "Doings" were published. Included is the arrival of Mr. Clinton B. DeSoto, W9KL, from Middleton, Wisconsin, who has hooked up with us in the capacity of Assistant to the Secretary, which title Mr. A. L. Budlong relinquishes to become Assistant Secretary.

Mrs. Winston Abbott, *née* Dorothy Menk, none other than DEM of Communications Department fame, has a permanent schedule now. The wedding was held April 12th with FEH and EV among those present.

W1SZ has changed location again. The station is located now in the State Armory at Hartford.

Nearly every member of the Hq. Staff dropped in at the New England Division Convention in late April at Worcester, Mass., at one time or another. The week before the convention Fred Schnell, former Traffic Manager, was the guest of K. B. Warner. "FS" had his golf outfit in tow. Nuff sed!

D. H. Houghton, *QST*'s Circulation Manager, has left for a three weeks' business tour of the east, and middle west, checking up on *QST* distribution. Ralph Beaudin is holding down the department in Dave's absence.

F. E. Handy is attending the Midwest Division Convention.

How the mighty have fallen! We cannot keep the news any longer. James Joseph Lamb, Technical Editor of *QST*, was married on May 5th to Miss Josephine Gleason in Hartford. The couple left for the great open spaces following the wedding and Mr. Lamb is booked to turn up at the Midwest Division Convention.

Considerable interest is being shown at Hq. in the coming 28-mc. tests in June.

— *C. C. R.*

Silent Keys

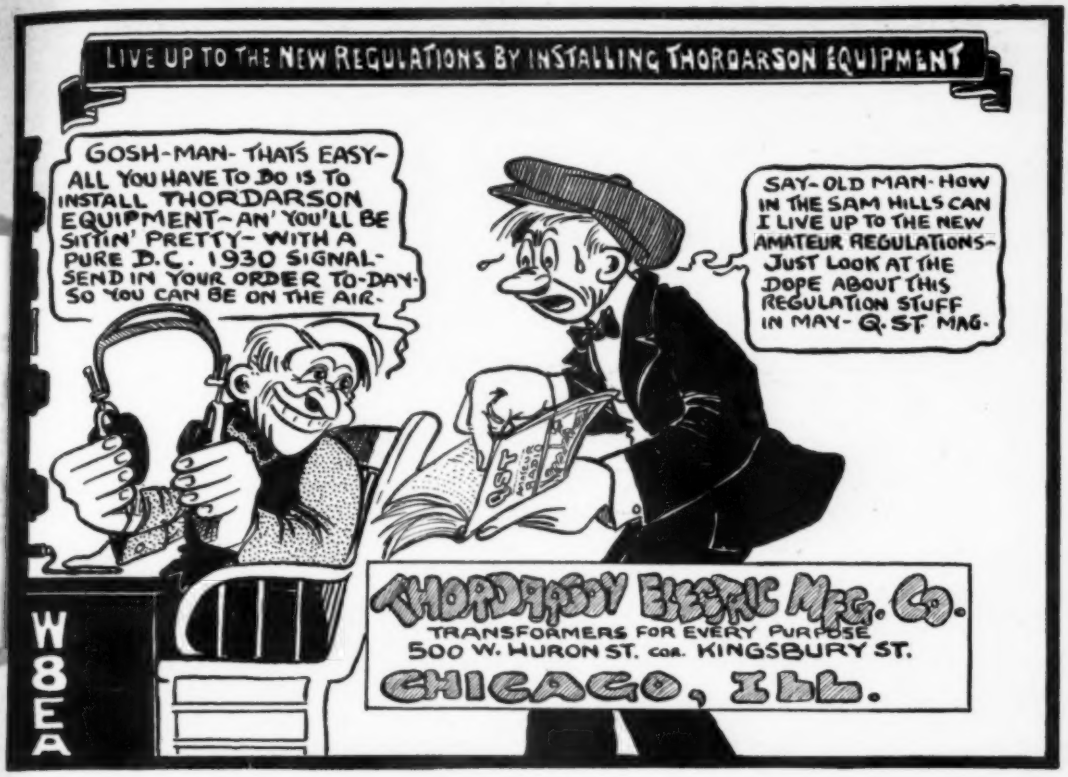
It is with deep regret that we record the passing of these amateurs:

Ernest R. Hood, Cambridge, Mass., W1AOW.
George G. Goode, Centerview, Mo., W9GBT.
Charles S. Taylor, Buffalo, N. Y., W8PJ.
Carl E. Trube, Yonkers, N. Y., Ex-2BK.
LeRoy A. Dey, Osborne, Kans., W9CNT.

Strays

PAOOOOOOOQF is reported in a recent list of calls heard. We'll bet that station doesn't sign very often! Or maybe the reporter's typewriter stuttered.

Pages missing here were advertisements and have been removed so that the volume will not be too bulky.


LIVE UP TO THE NEW REGULATIONS BY INSTALLING THORDARSON EQUIPMENT
GOSH-MAN- THATS EASY- ALL YOU HAVE TO DO IS TO INSTALL THORDARSON EQUIPMENT- AN' YOU'LL BE SITTIN' PRETTY- WITH A PURE D.C. 1930 SIGNAL- SEND IN YOUR ORDER TO-DAY- SO YOU CAN BE ON THE AIR-
SAY- OLD MAN- HOW IN THE SAM HILLS CAN I LIVE UP TO THE NEW AMATEUR REGULATIONS- JUST LOOK AT THE DOPE ABOUT THIS REGULATION STUFF IN MAY- Q.ST MAG.
QST
THORDARSON ELECTRIC MFG. CO.
TRANSFORMERS FOR EVERY PURPOSE
500 W. HURON ST. cor. KINGSBURY ST.
CHICAGO, ILL.
W 8 E A

GUARANTEED MERCHANDISE AT SENSATIONAL PRICES

MONEY RETURNED IF NOT SATISFIED

PARCON FILTER CONDENSERS at 65% off list price. Brand new! Transmitting Filter Condensers: 1000 Volt DC Working (Continuous): 1 Mfd. — $1.90. 2 Mfd. — $2.10. 4 Mfd. — $3.65. 6 Mfd. — $4.85. 8 Mfd. — $6.95. 2000 Volt DC Working: 1 Mfd. — $3.80. 2 Mfd. — $5.90. PARCON Mica plate and grid blocking condensers. .002, .001, or .0005 Mfd. 750 DC Working. — $1.00. 1500 Volt — $1.23. Special .002 Mfd., 2250 Volt — $1.73. RCA-Stromberg-Carlson 4 Mfd., 650 Volt DC Working metal-cased filter condensers. — $2.05. 7 Mfd. — $2.60. 2 Mfd., 450 Volt — $.75. High-grade unmounted 2 Mfd., 850 Volt DC Working filter condensers. Mfg's type. A quantity of these units may be series-paralleled for any desired capacity and voltage. SPECIAL — $.70 each. Four for $2.50. Eight for $4.65. Twelve for $6.45. Twenty for $10.00 U. S. Tool 11 plate SLF variable condensers. Easily cut down. Low-loss. — $1.00. Two for $1.75.

FRESHMAN POWER TRANSFORMERS. A neat job in a compound-filled case. Fine for Transmitter, Amplifier, or Eliminator. Gives 375 volts and two 7½ volt center-tapped. 125 Watt. 7½ lbs. — $2.10. Two will give 750 volts and four 7½ volts. All center-tapped. SPECIAL Two for $3.95. SPECIAL RCA POWER TRANSFORMER. Designed for use with UV-876 in primary to keep voltage steady (A resistor may be used in place of the tube.) Gives 7½, 7½ and 1100 Volts. All center-tapped. 175 Watts. 11 lbs. Priced to sell fast — $5.95. Metal cased Filament Transformers. Well constructed. 75 Watt. 2½ and 2½ Volts — $2.95. 7½ Volts — $2.80. 7½ Center-tapped — $3.75. 7½ CT and 7½ — $4.25. 7½ CT and 7½ CT — $4.95. 10 Volt — $3.25. 10 CT — $3.75. Power Pack transformer. 100 Watt. Gives 1½ and 2½ Volts and 5, 5, and 650 Volts center-tapped — $3.10. Unmounted 7 Volt, 50 watt Filament transformers. Easily rewound for any filament voltage — $1.50. Two for $2.60. RCA Audio transformers — $1.35. Output transformers — $1.35.

Guaranteed TUBES! Unconditional 60-Day Replacement. A Guarantee that really means something. UX-210 — $3.95. UX-281 — $3.25. UX-280 — $1.55. Good Tubes. Tested before shipping. (No free replacement.) UX-210 — $2.10. UX-281 — $1.50. Other types in list.

WELL-MADE POWER CHOKES. 30 Henry, 175 Milliampere — $2.25. 2000 Milliampere, ½ Ohm Key thump filter choke — $2.95. 30 H, 120 MA — $1.75. 2½ Amp. "A" Chokes — $1.95.

RCA Wire-wound, Vitreous Enameled 5000 ohm. 50 Watt Grid-leaks. With mounting rod. SPECIAL — 48c.

We ship COD if you wish. All prices FOB New York

QUICK SERVICE!! SEND FOR "SPECIALS"

HARRISON RADIO CO.

35 Ft. Washington Ave. **New York City**

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 15c per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15c rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

PLATE power for your set, the very heart of its performance. For quietness, DX ability, life-long permanence, absolute dependability, lowest ultimate cost, no other plate source even approaches the achievement of an Edison steel alkaline storage B battery. Built painstakingly; every joint pure nickel, upset electrically welded. Genuine Edison Electrolyte. Our list describes complete batteries, construction parts, enameled aerial wire, silicon steel. Available immediately, filament and plate transformers for the new 872 rectifier, complete plate power units. Rectifier Engineering Service, radio W8ML, 4837 Rockwood Road, Cleveland, Ohio.

SPECIAL rectifier aluminum, $1.25. Lead, $1.00 square foot. Elements 1 x 4 15 cents, 1 x 6 17 cents pair. All prepaid. Best silicon transformer steel cut to order, 25–35 cents pound. Postage extra. George Schuls, Calumet, Mich.

FOR sale — to settle an estate, Weston model 433 a.c. voltmeter 0–300, new condition, $22.50. Roller Smith type G8D–d.c. ampere meter 0–50, in wooden case, new condition, $17. George H. Smith, Charleroi, Pa.

CRYSTALS — lowest prices on real high quality crystals. Write W6EBV.

SELL — complete station, from fones to monitor, all standard parts, $60. Picture on request. W5AQJ, Box 228, Weatherford, Texas.

SELL — new W.E. 211E fifty-wid socket, used eight hours, $12. W9CAS.

FOR sale — SANC's world-famous 50-watt transmitter must go. Panel mounted including 203–A tube and tube rectifier. Thordarson 1000–1500 volt transformer. Complete, ready to operate, $85. No favorites — guaranteed to go to first Ham sending money — Hurry. — Silver Marshall round the world four complete with tubes and Willard "A" power, $40. No trades. George H. Smith, Charleroi, Pa.

SELL or trade — two new R.E.L. transmitting coils, $3.85 each, or both, $7.35. Also one .00025 new Cardwell transmitting condenser. Want wavemeter monitor or what offered. All replies answered. Emil Darges, W9GAS, Ord, Nebr.

WANTED — UX849m 851, UV204A. State condition, price. Sell complete new mercury arc rectifier, $25. Fred Manion, 220 South 39th St., Philadelphia, Pa.

NEW Morton Electric Co. motor generator sets, wholesale prices. Hanson, 4832 Rice St., Chicago, Ill.

ESCO generators, 32-volt d.c. drive, output 1000 volts d.c., 175 watts, new, $30. Used, $25. About eight other Esco types. Crocker Wheeler 275 volt d.c., $8. Used, $5. Send for list. R. Wood, 46–20 102nd St., Corona, N. Y.

FULL-wave Tungar rectifiers (Westinghouse), 2 amperes; only one required for keep alive, also for chargers and A eliminators. $2; 8X210 oscillators, 6 inches overall, large plate, $3.53; type UX28ls, $1.95. Tested in transmitter. New and guaranteed. Antenna feeder spreaders, Pyrex glass, 15 cents. W9DWA 5508 Fulton St., Chicago.

BARGAINS in quality merchandise. Everything new and guaranteed to your satisfaction. C.O.D. orders accepted. Columbia transmitting condensers: Working Voltage — 1000 d.c., 1 mfd., $1.40; 2 mfd., $2.30; 4 mfd., $3.80; 8 mfd., $6.45; 2000 V. d.c. Working — 1 mfd., $3.95; 2 mfd., $6.05. Power filter chokes — 30 Henries, 200 m.a., $2.50. 30 Henries, 125 m.a., $1.75. Quality tubes: UX281s, $2.25; UX210s, $2.95; UX280s, $1.45. Special unmounted filter condensers, — 850 V d.c. Working: 2 mfd., each, 80c, four for $2.60, six for $3.75, eight for $4.80, twelve for $6.60. 1 mfd., four for $1.35, eight for $2.60, sixteen for $4.80. R.C.A. Power Rheostats, heavy duty, 65c. More bargains. Send for list. Columbia Specialty Co., 1038 Longwood Ave., N. Y. C.

I have two 250-watt screen-grid power tubes for sale at a reasonable price. Write: E. Ewing, Jr., 29 S. LaSalle St., Chicago, Ill.

SPECIAL new Thordarson R210 compacts, $5.25, postage extra. We make transmitters, receivers, power supplies and special equipment. Bulletin available. Pontiac Engineering Co., 1100 Avenue I, Brooklyn, N. Y.

SYNCHRONOUS motors for television ¼ h.p. frames, 110 volts, 60 cycles, 1800 rev., $16. f.o.b. W2JI, Secaucus, N. J.

CRYSTALS for sale or trade. 3500 kilocycle, $10; 1750 kilocycle, $7. Ground to your specified frequency. W9DLL, 222 West 73 Terrace, Kansas City, Mo.

TRANSFORMER specials. 110 volt, 60 cycle. Mounted and guaranteed. 150 watt 650-0-650, 7½, 7½, $7. 550-0-550, 7½, 7½, $6. 500-0-500, 7½, $4.50. 250 watt 550, 750 each side, 7½, 7½, $10.50. 700 watt 1000, 1500 each side, $14.50. Filament transformers, 5000-volt insulation center tapped 75 watt, 7½, 7½, $3. 10 volt, $3. 12 volt, $3. 2½, 2½, $3.50. 150 watt, 10 volt, $4.50. 0–550, 7½, 7½, $3.00. 350-0-350, 5, 2½, 2½, $4.50. 30H 85 m.a. double choke, $1.75. 30H 100 m.a. double choke, $3. 30H 160 m.a. single adjustable, $4.50. 30H 250 m.a. adjustable, $6.75. 2 m.f. working voltage 600 unmounted condensers, 65c. Condenser blocks, 450 volt, 2-4-4-1-1, $3.65. Prices are net F.O.B. Electrone Laboratories, 834 N. Randolph St., Philadelphia, Pa.

QSLs — plain at $1.00 per hundred. W9BEU, 9032 Windom, St. Louis, Mo.

W2API — call changed to W2ZC. 1000-watt xtal beam transmitter, Transatlantic radiogramme schedules. Will my old friends of W2API please look for me under W2ZC? Harold Baring Churchill, Little Silver, N. J.

TYPE 866 seconds (new tubes). All characteristics normal. Mercury vapor — 2.5V. filament. Guaranteed perfect operation and safe delivery, $5.00 each. E. Ewing, Jr., 29 S. LaSalle St., Chicago, Ill.

WE build anything from a crystal holder to a broadcast station. Smith, 65 Glenwood Road, Montclair, N. J.

TELEVISION — Listen in on announcements from W3XK, 2900 kc., 8 o'clock, E.S.T., or send for descriptive literature. Jenkins Laboratories, 1519 Connecticut Ave., Washington, D.C.

RECTOBULBS, R3, $10; R81, $5.25; Power Xtals, $12; Super-Wasp, d.c., $29.40; a.c., $34.40; Flechtheim, 2 mfd., 2000 wkg V. conds., $8.75; Tobe, $11.70; Jewell meters volt or m.a., $5.50; r.f., $9,90; set analyzer, $72; Leach relays, $9 and $6.75; Sangamo .002 5000 V. conds., $1.40; R.E.L. sockets, 50 watt, $1.50; 204-A, $4; Alcoa, 99.6% aluminum, 70c sq. ft.; W.E. and R.C.A. tubes; tubes repaired. Any other apparatus. Henry's Radio Shop, W9ARA, Butler, Mo.

G.E.1000-watt transformers, 1100–2200–4400 each side center tap. Used by Cornell, Navy, and 300 hams. Guaranteed unconditionally, $12. F.O.B. Detroit, Fred G. Dawson, 5740 Woodrow, Detroit, Mich. Some 500 watters, no center tap (bridge circuit) $5.00.

WHILE they last — piezo quartz plates, 3500 kc., $10; 7000 kc., $20. Dr. Gerald W. Fox, 419 W. State, Ann Arbor, Mich.

SELL — DeForest long wave "Cornet," S-W (complete), Browning-Drake, X210 new, $2.85. Signal key, bunch parts. write L. R. Mitchell, 1106 Kenneth Drive, Lakewood, Ohio.

SELL — W9AGX, Racine, Wisconsin complete. Write for details.

CRYSTALS — unconditionally guaranteed 1750 kc., $7.50; 3500 kc., $10; 7000 kc., $15. Crystal holders, $3.50. W2BUW, 81 Parkway Road, Bronxville, N. Y.

SELL or trade: R.C.A. 203-A, 211, 845, 852, 860, 204-A; W.E. 211D, 212D; power Xtals; 210 Xmitter; dynamotors; 500-V. MG; other apparatus. W9ARA, Butler, Mo.

QUITTING business — 750-V. ¼ amp. W.E. motor-generator, t.p.t.g. trans. 3 tube Aero coil receiver, $25. Miscellaneous radio parts. Everything in excellent condition. Almost new. Write me. L. Lorber, 801 Colver St., Muscatine, Iowa.

FLECHTHEIM 1500-volt condensers, porcelain insulators, 2 mfd., $4.50; 4 mfd., $7, used. Mershon condensers, $1.75. New National 3000-volt .00045 with vernier dial, $9.50; .00023–6000 volt, $12.85. Jefferson 300-volt center-tapped transformers, $1.65. Pilot D. C. Super Wasp kit, $28.90, with a pair of Timmons 'phones free. Pilot A. C. Super Wasp kit with cone speaker and power pack, $50. Newest type Rectobulbs R3 mercury vapor, $10 prepaid. 281 type mercury vapor, $7 prepaid. Allen Bradley radiostat, new type 500 watt, $5.50. Aero Monitors, $10.85. R.E.L. Wavemeters, $16. Pilot and Silver Marshall coil forms, $.39. Wire-wound 5000-ohm grid leaks, $.39. Freshman 375-volt, not center-tapped, and two 7½ center-tapped filament windings, $2.25. Signal High Frequency buzzer, $.95. New Cardwell .00035 SLF condensers, $.79. No. 14 cotton covered enameled aerial wire, $.90 hundred feet. No. 12 solid enameled aerial wire, $.95 hundred feet; $1.80 two hundred feet coils. R.E.L. 50-watt sockets, $1.50. Used Kellogg double-button microphones, $35. Sangamo 5000-volt .00025, .0005, .001, .002 mica condensers, $1.50. Thordarson key click filter chokes, 1½ Henry, 200 mill, $2.95. Thordarson modulation transformers, $2.95. Latest Amateur Call books, $.85. Used Western Electric 212D 250-watters, $35. R.E.L. sockets for same, $9. New UX 852, $28. Slightly used R.C.A. 211, $17. Slightly used 204As, $50. R.C.A. UV 217As, $7.50 each. UX 866s, $11.85; New UX 851 1000-watter, $250. Western Electric 211A, D, or E 50-watters, $15, slightly used. New 211Ds, $20. Jefferson, 30 Henry chokes, 100 mills, $3.25. Thordarson twin chokes, 20 Henry, 250 mills, each $6.25 2500-volt lamp 133 segment Spaulding generator, directly coupled to G.E. five-horse-power motor, cost $650, special $225. Here's a real buy. Limited quantity new original cartons Gold Seal UY 227 tubes, $.89 each; UX 245, $1.15; UX 280, $1.05; R.C.A. High Mu UX 240, $1.00; R.C.A. Voltage Regulator UX 874, $3.25. Broadcast microphone cases. $2.25. Thordarson 400-volt each side center, 150 watt, $3.90. Signal Corp 3/16" silver contact keys at $.95. One thousand ohm relays, $1.25. Chemically pure aluminum, $.70 sq. ft. Also aluminum panels and corner strips for any size cabinet. Write for prices and free Ham sheet. 19 Strand enamel silk-covered Litxendacht wire one cent a ft. New Signal bugs, $12 net. Moving to larger quarters. Visit our radio shack when in town. Good time assured. What have you for sale or trade? We carry everything for the Ham. More foreign trade solicited. 24-hour service. Uncle Dave, 117 N. Pearl St., Albany, N. Y.

CRYSTALS — Guaranteed excellent oscillators. One inch square sections of your approximate specified frequency: 7000-kc. band, $15; 3500 kc., $10; 1715 kc., $8; Guaranteed blanks, $4. Frequency precision, .1%. One-day service. Precision Piezo Supply, 427 Asia St., Baton Rouge, La.

SELL — Westinghouse 27.5/350-volt dynamotor, $12.50. S. Magid, 275 Corbin Place, Brooklyn, N. Y.

SELL — one Westinghouse dynamotor, 27.5/350-volt, new, never used, $9. Roy Philhower, Long Valley, N. J.

WHY buy cheaply made tubes when you can get a product of the General Electric Co. for only $1.25. Genuine G.E. Type CG1162 Navy Five-watters will stand up to 750 volts on plate and 7.5 on filament. Ideal for either oscillators, modulators or power amplifiers. They are a bargain you don't very often get. Neon tubes for wavemeters, $.50 each. Our surprise package is going over big; values up to several dollars in one package for only $1.00 each. Money back if not 100% satisfied. Special: 0–100 milliammeters, $1.50 each, 201A type tubes, $.50. All merchandise guaranteed. Sent C.O.D. or P.P. E. Hufnagel, 879 So. 18 Str., Newark, N. J.

DIRECT reading wavemeter type 174 adopted for receiving or transmitting sets, employed with either damped or undamped waves, for use in commercial and experimental waves. New, less than one-half cost. H. T. Watson, 149 Mulberry St., Newark, N. J.

NEW Hilet transmitter panel name plates, also chokes and transformers. See Hilet advertisement in this issue. Jewell No. 54, 0 to 2000V meters, $1000. ohms per volt, $14. M. Leitch, Park Drive, West Orange, N. J.

WANTED — Vol. I of *QST*, bound or single copies. State condition and price. K. B. Warner, 1711 Park St., Hartford, Conn.

FOR sale — 50-watt xmitter. A1 outfit. W2BMB.

HAMS only — Elgin, Ill., etc. watches 25–35% off. Radio apparatus taken exchange. Fine watch repairing. W9EUU, Sibley, Ill.

SELL d.c. super-wasp in cabinet, wired, $35. Junior Teleplex, $7.50. Want 80-meter fone. W6DGN, Route 3, Tucson, Ariz.

FOR sale — Used 387 Western Electric mike, $25. Changing to condenser mikes, WDGY, Minneapolis.

203A R.C.A. thoriated filament, 50-watt, brand new, in sealed boxes. No reasonable offer refused. Only seven on hand. Radio Engineers, 250 E. 57th St., N. Y. C.

$20 c.o.d. takes 150–25,000 meter Kennedy with 2-step. V. F. Jones, 815 Loma Ave., Long Beach, Calif.

SELL Weston model 537 test box, good condition, $35. Also other used apparatus. Send for list. W. C. Holder, Valdosta, Ga. W4AAZ.

W8BNF — selling out. Will consider a reasonable offer on any apparatus. G. H. Snyder, Lewisburg, W. Va.

SELL — Two UV2ll d's, used less than six hours, $15 each. Quarts crystal, one inch square, exact frequency 3525 KC., $12.50. Ten 5-watters, VT2's, brand-new, $1.50 each. One W.E. 50-watter, brand new, $10. Prepaid on receipt of price. W2FL GRAR.

QSLs 100 two-color, $1.00. Stationery, samples. W9CKA, Corwith, Iowa.

WANTED — 500-cycle generator and transformer. What have you? Claude Mitchell, Ray, Ariz.

6000V., 12,000W., 3-phase drive motorgenerator, $1500. 3000V. 6000W. 3-phase drive motorgenerator, $500. 2000V. 500W. 1-phase drive, $195. 1500V. 400W. 3-phase drive, $125. 1000V., 300W., $95. 1000V., 250W., $85. ¼-Hp. 3450 R.P.M. motors, $10.50. Converters, 32V. d.c. to 110V. A.C., $35. Queen City Electric, 1734 Grand Ave. Chicago.

CONDENSERS, 10 mfd. tested at 1000V., working voltage 600, $1.75 each prepaid. W9ARA, Butler, Mo.

VIBROPLEXES, Teleplexes, Omnigraphs, transmitters, receiver, wasps, 50-, 75-, 100-watters, 8 tubes. Bought, sold, traded. Ryan Radio Co., Hannibal, Mo.

TRADE $100 Holton Revelation Trumpet es Remington Typewriter for Motor Generator es Fone Xmtr parts. Write offer. W9GKG, Milledgeville, Ill.

SELL, trade. Battery super-wasp, $25; Silver-Marshall four-tube assembled, $10; Radiophone transmitter, $25; Acme transmitting condensers, $4; transformers, motors, chokes. Write for list. UV203As. Send me ur lists. Stephen Beck, Roosevelt, N. Y. W2CE.

TRADE — Three eighty-meter plates and five tested blanks. Consider power-filament transformer for 280 rectifier, meters, condensers, transformers, tubes, etc. Jack Frost, Box 3271, Amarillo, Texas.

SELL 500 *QST's*, S. & I., R.N.s. Schindler 116 Rebecca, Scranton, Pa.

QSL cards, message blanks, wall cards, stationery. Selden's, Cranesville, Pa.

THE finest in radio for amateur, broadcast and marine. The most modern short-wave receivers. Four to ten tube designs. Radiophone CW transmitters of any power or type. We make a complete line of apparatus, including speech amplifiers, filter coils, inductances, power units, etc. Any special apparatus, designs, built to order, using your parts if desired. Prices on request. New bulletin lists complete line of apparatus. Write for copy. Ensall Radio Laboratory, 1527 Grandview St., S. E., Warren, Ohio.

AMATEURS — experimenters, builders. We serve over 4000 I.R.E., A.R.R.L., etc., experimenters and "nuts." Full discounts. $50,000 stock approved parts — no sets. Over four pounds catalog, circuits, data, prepaid, 50c. Weekly bulletins (new items, results of experiments, etc.), 20 weeks $1.00. Sample experimenters "Over the Soldering Iron" magazine, 25c. Transmitting data, price list, etc., 25c. Kladag Radio Laboratories, established 1920, Kent, Ohio.

TELEGRAPHY — Learn Morse and wireless telegraphy. Big salaries. Tremendous demand. Expenses low, can earn part. Catalog free. Dodge's Institute, Wood St., Valparaiso, Ind.

GUARANTEED 281s, $2.50. Filter chokes, 75c and up. Nassau Radio, Seaford, N. Y.

CRYSTALS carefully ground for highest output demanded by modern transmitters. Frequency precision. 1% at room temperatures. 7000 kc., $15; 3500 kc., $12; 1750 kc., $9; guaranteed blanks, $4. W9DRD, Herbert Hollister, Edwardsville, Kans.

A.R.R.L. sweater emblems should be worn by all League members. They are yellow and black 5" x 8" diamond, felt letters and embroidered symbol. Only $1.00. Money order or currency only accepted. Eric Robinsion, 135 Jefferson Road, Webster Groves, Mo.

TELEVISION Kit — 12-inch scanning disc; shaft and bearing frame; motor hub and driving disc; synchronising screw; neon lamp and lamp holder $7.50, parcel post prepaid. Jenkins Laboratories, 1519 Connecticut Ave., Washington, D. C.

TUBES — nationally known brand type 250, never used, $2.00 each. F. W. Wiebers, 600 Wisconsin Ave., Oak Park, Ill.

SELL — new wired Silver-Marshall round world four with extra coils, $28. New General Electric health vibrator with stand, $3. Peerless mounted cone, $4. 0–2.5 Jewell thermo-coupled ammeter, $5, 0–10 Jewell voltmeter (used), $3. R.C.A. Radiola, "20", $11. Atwater-Kent "35", $8. Western Electric "25-B" power amplifier with cone speaker and tubes in perfect condition, $55. Excellent short-wave set, detector and two step with S-M audio transformers, $15. James McGill Boyer, W8ALD, 6116 Howe St., Pittsburgh, Pa.

WANTED — parts for 250-watter. Tube, meters, condensers, rectifier, filter. What have you OM? Good condition? Price? Box 544, Hemet, Calif.

Q R A SECTION

50 c. straight with copy in following address form only:

W2BJI — Hackensack Radio Association, Y. M. C. A. Building, Hackensack, N. J.

W4ADY — R. L. Miller, Jr., 501 Park Ave., Wilson, N. C.

W4HC — H. Dohlen, 3219 Pearl St., Jacksonville, Fla.

W5BKW — Leo Havard, 7106 Hemlock St., Houston, Texas.

W6IK — H. Y. Ballou, 478 Lewis St., Los Angeles, Calif.

W8COL — H. G. Noah, 1240 Beverly Place, Brookline, Pittsburgh, Pa.

W9APH — Harold A. Hughson, 508 Michigan Ave., Manistique, Mich.

W9LQ — Leslie M. DeVoe, 3360 N. Meridan St., Apartment D4, Indianapolis, Ind.

W1MK

A.R.R.L. Headquarters

R. B. Parmenter, Chief Op. "rp"

The following calls and personal sines belong to members of the A.R.R.L. Headquarters gang:

W1AKW–W1KP Clyde J. Houldson "ch."
W1BAW R. B. Beaudin.
W1BDI–W1XL F. E. Handy "fh."
W1CEI J. J. Lamb "jim."
W1DF Geo. Grammer "hg."
W1EH K. B. Warner "kb."
W1ES A. A. Hebert "ah."
W1FL–W2JR G. Donald Meserve "dm."
W1SZ–W1BIZ C. C. Rodimon "rod."
W1UE E. L. Battey "ev."
W9KH Clinton B. DeSoto "de."

SUPER-DAVOHM RESISTORS

preferred and specified by experts the world over, for . . . .

laboratory standard
high voltage regulators
vacuum tube plate resistors
vacuum tube grid resistors
voltmeter multipliers
telephone equipment
television amplifiers
fading controls
isolation resistances

Catalogue sent on request

If your dealer cannot supply you—write us

THE DAVEN COMPANY
158 Summit Street, Newark, N. J.
Resistor Specialists

"Standards of Efficiency"
5 to 5 million ohms; guaranteed 1% tolerance

To Our Readers who are not A.R.R.L. members

WOULDN'T you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of this issue. We should like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio. You will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below — clip it out and mail it today.

A bona fide interest in amateur radio is the only essential qualification for membership

AMERICAN RADIO RELAY LEAGUE
Hartford, Conn., U. S. A.

I hereby apply for membership in the American Radio Relay League, and enclose $2.50 ($3 in foreign countries) in payment of one year's dues, $1.25 of which is for a subscription to *QST* for the same period. Please begin my subscription with the ..... issue. Mail my Certificate of Membership and send *QST* to the following name and address.

.....

.....

.....

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of *QST*?

.....

Thanks

For Your Convenience

QST'S INDEX OF ADVERTISERS IN THIS ISSUE

Acme Apparatus Company 57
Allen-Bradley Company 69
American Piezo Supply Co. 82
American Sales Company 75
Amrad Corporation 77
Arcturus Radio Tube Co. 96
Auriema, Inc., Ad. 68
A.R.R.L. Apparatus 88
A.R.R.L. Application Blank 94
A.R.R.L. Book Dept. 95
A.R.R.L. Emblem 70
A.R.R.L. Handbook ..... 72, 76, *Cover II*

Blan, The Radio Man 84
Burgess Battery Co. ..... *Cover IV*

Candler System Company 64
Cardwell Mfg. Corp., Allen D 53
Ceco Mfg. Company 63
Central Radio Labs. 56
Commercial Radio Institute 84
Cornell Elec. Mfg. Co. 80
Corning Glass Works 81
Crosley Radio Corp. 83
Cunningham, Inc., E. T. 54

Daven Company 93
DeForest Radio Co. 1
Deutschmann Company, Tobe 88
Dodge, C. K. 74

Electrad, Inc. 82
Electric Specialty Co. 90

Frost, Inc., Herbert H. 80

General Radio Company 2
Greben, F. 82
Gulf Radio School 82

Hall's 72
Hardwick, Hindle, Inc. 72
Harrison Radio Company 91
Hatry & Young 86
Hilet Engineering Co. 72
Hoodwin & Company, Chas. 76

International Resistance Co 65

Jenkins Television Corp. 4
Jewell Electrical Instrument Co. 87

Kienzle, Henry A. 84

Leeds Radio Co. 71

Manhattan Electric Bargain House 66, 67
Marthens Company, A. F. 62
Massachusetts Radio & Telegraph School 80
McGraw-Hill Book Co. 62
Munsig, Arthur L. 78

National Company 90
National Radio Tube Co. 86

Pacent Electric Co. 74
Perryman Electric Company 60
Potter Company 66

QST Binder 58
QST Volume X 78

Radio Engineering Laboratories 64
Radio News 85
Radio & Television Institute 73
RCA-Victor Company 59
Rectifier Engineering Service 78
Rooney, John T. 84

Scientific Radio Service 89
Shallcross Company 68
Silver-Marshall, Inc. 79
Sprague Specialties Co. 55

Teleplex Company 74
Thordarson Elec. Mfg. Co. 91

Vibroplex Company 78

Ward Leonard Electric Co. 89
Wedel Company 56
Weston Electrical Instrument Corp. 61
Wireless Egert Engineering 80

QST

The Official Organ of the A·R·R·L

VOLUME XIV — JULY, 1930 — NUMBER 7

Editorials		7
Your Broadcast Receiver as a Shortwave Superhet	*Geo. Grammer*	8
A Compact and Inexpensive Chemical Rectifier	*George S. Parsons*	15
Annual Meeting of The A.R.R.L. Board	*K. B. Warner*	20
New Two-Volt Tubes		22
Official Frequency System Progress		23
New DeForest Tubes		24
Naval Reserve Holds Its First National Emergency Drill	*Wm. Justice Lee*	25
Hamming With a Portable in Africa	*Clyde DeVinna*	27
Correction		32
VE2CA		33
New England Division Convention		38
Experimenters' Section		39
I.A.R.U. News		45
Communications Department		47
Calls Heard		59
Correspondence Department		60
Correction		86
Silent Keys		86
Charles S. Taylor		90
Ham-ads and QRA's		92
QST's Index of Advertisers		94

***QST* is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A. Official Organ of the A.R.R.L. and the International Amateur Radio Union**

Kenneth B. Warner (Secretary, A.R.R.L.), *Editor-in-Chief and Business Manager*

James J. Lamb, *Technical Editor* — **George Grammer**, *Assistant Technical Editor* — **Clark C. Rodimon**, *Managing Editor*

David H. Houghton, *Circulation Manager* — **G. Donald Meserve**, *Advertising Manager*

Advertising Offices.....55 West 42d Street, New York City
Editorial Offices.....1711 Park Street, Hartford

Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, $2.50 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, $3.00 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

Copyright 1930 by the American Radio Relay League, Inc. Title registered at United States Patent Office.

A SAFE GUIDE

in the selection of insulation for Radio Transmitting and Receiving Sets

OVER 300 broadcasting stations, leading radio telegraph systems, the United States Army, Navy, Air Mail, Coast Guard and Ice Patrol Services, explorers like Commander Byrd, and exacting amateurs everywhere have utilized PYREX Insulators in many spectacular achievements.

Regardless of whether you are sending or receiving — on land, sea or airplane — you should be thoroughly familiar with the PYREX Antenna, Strain, Entering, Stand-off and Bus-bar Insulators that are helping these leaders to make radio history.

The new PYREX Radio Insulator booklet lists all types and sizes with data that you will want for ready reference.

Return the coupon for your copy, and if you want further advice on any insulation problem, our Technical Staff will answer your questions promptly.

Send the coupon for your copy

CORNING GLASS WORKS
Corning, N. Y.

Gentlemen:

Please send me copy of your new bulletin on Radio Insulators.

Name

.....

Address

.....

.....

QST 7-30

EDITORIALS

A SIGNIFICANT feature at the recent meeting of our Board of Directors was the very lively advance interest which had been shown by members in the important topics which were to come up for discussion. Helped somewhat by the preparation of a list of topics some weeks in advance of the meeting, and by the usual call in *QST* urging members to communicate their views to their directors, the meeting had the advantage of an unusually complete expression of amateur opinion and desire. It is a sign of good health in an organization when its members actively interest themselves in its affairs and when, as this year, they so well unite in viewpoint and general sanity of comment.

This was very well shown in the study of out-of-band operating. There was little question that when the Board met the directors would feel that the Government ought to be asked to undertake better enforcement of allocations, but what would the members think of such a course? The answer was clear, because the members of every division had expressed themselves in advance, voluntarily to their directors, and in emphatic language. That, we say, is a good sign.

This lively interest was particularly evident in the 'phone question. Many points of view had been expressed. There were, of course, some requests to widen the 3500–3550 'phone band, many to keep it as it is, some to shift it to the other end of that band; suggestions to make the use of oscillator-amplifier transmitters compulsory; and many suggestions concerning the desirability of increasing the qualifications required of the 'phone operator. Experienced 'phone men in particular joined in sponsoring this last suggestion. The Board's job in deciding upon a course that represented "the greatest good to the greatest number" was a difficult one, but nothing like as difficult as it would have been without the very extensive expression of opinion which had been made by members everywhere.

The Board's eventual decision, as reported elsewhere in this issue, was to seek no change in the size or location of the 3500-kc. 'phone band, to frown upon any specifications of apparatus, but to sponsor a new grade of operator's license to be required for all 'phone operating, the basic requirements of which would be the possession of special technical qualifications and at least a year's C.W. experience. 'Phone transmission must be recognized as an advanced form of communication, the fundamental requirement for which is the possession of a very high-grade C.W. station. To operate it intelligently the amateur must first be a skilled and experienced C.W. operator. The 'phone bands are badly congested today, but not with good 'phones. The 'phone amateurs consist of a small number who are well-versed technically and seriously interested in doing a good job in a very difficult field, and a large number of "punks" who make the night hideous with unintelligent efforts directed at inadequate equipment. The League's present plan for 'phone thus proposes a big improvement for the legitimate 'phone operators by the eventual removal of the poor 'phones. The elimination of amateurs without the qualifications or the enterprise to learn the code, and of C.W. amateurs who are just "messing around" temporarily with 'phone, is the biggest favor that could be done the 'phone man. The good 'phone man deserves protection and the right to adequate operating facilities. The Board's action will clear the air for him, and the good 'phone man will be well pleased with the change.

K. B. W.

ALUMINUM SHIELDS

BEAUTIFUL SILVER DIP FINISH
Genuine ALCOA Stock

5 x 9 x 6, $1.89 — 14 x 6 x 6, $3.95

Any size to order in 24 hours.

ALUMINUM COIL SHIELDS

3½ x 6½ straight, 49c

3½ x 4½, 60c — 3 x 4¾, 55c

Sand blast or polish, 20c extra

ALUMINUM TUBE SHIELDS

2½ x 4½ straight
2½ x 2 Hole cover
1⅞ x 4¼, inc. base
2 x 4¼, inc. base
} 48c

TEST LEADS, Genuine RADION sleeves over No. 18 wire. Tips or fork lugs on other end. 20" long 69c pair, 36" long 79c pair. Just the thing for meters and other uses.

Insulating washers for binding posts on metal, 15 for 10c.

Insulated tip jacks, 12c.

Dubilier Condenser .01 or .015, 34c.

Insulated coupling or shaft extension, 33c.

G. R. type stand-off insulators, 4 colors, 17c.

X-L variodensers model "N", 29c.

115 up-to-date set diagrams, 8½ x 11 loose leaf perforated, $2.50.

Please include postage

BLAN, THE RADIO MAN, INC.

89Y Cortlandt Street — New York City

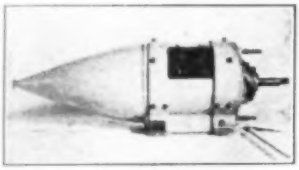
QUARTZ OSCILLATING CRYSTALS

Scientifically Prepared for Maximum Power and Unconditionally Guaranteed 1 in. square sections, (*within ½ of 1% of your specified frequency*), supplied *promptly* at the following prices:

75-100 meters $12.50
100-200 meters 10.00
200-600 meters 15.00
1 in. Tested blanks, 200-400, 400-600 meters 5.00
Dustproof Bakelite mounts 3.00

(An accurate Calibration furnished with each crystal)
Sections of any practicable dimensions made to order
(Charges for grinding to exact frequencies given on request)

J. T. Rooney, B. Sc., 4 Calumet Bldg., Buffalo, New York
"Fifteen years' crystallographic experience"
"A pioneer crystal grinder"



U. S. NAVY SURPLUS

500-watt 500-cycle ball-bearing generators with exciters. Very special $7.50
500-watt 500-cycle transformers, easily tapped for any voltage $7.50
General Electric 24/750 150-watt dynamotors 27.50
General Electric 24/1500-volt 350-watt dynamotors .. $37.50

Shafts for external drive $3.00 additional

HENRY KIENZLE, 501 E. 84th Street, New York
Pioneer Distributor of Government Surplus

LEARN RADIO

in a school with a reputation for graduating competent men

Dormitory — Laboratory Workshop

SUBJECTS TAUGHT

Commercial Radio — Radio Service
Radio Broadcast — Navigation
Radio Mathematics — Laboratory
Vitaphone — Movietone

Enroll now for Fall Term beginning September 29th

Write for further information

COMMERCIAL RADIO INSTITUTE

38 W. BIDDLE ST. FOUNDED 1920 BALTIMORE, MD.

Angus Elected Central Division Director

IN a special election just held, the Central Division has chosen Mr. D. J. Angus, W9CYQ of Indianapolis, as its Director for the unexpired remainder of the term of the late Mr. Clyde E. Darr. The term ends January 1, 1931. Voting was as follows:

Angus, D. J.	876	votes
Prazak, R. T.	74	"
Sellers, R. C.	66	"
Spiller, A. G.	228	"
Stark, C. S	119	"
Wise, Dallas	166	"

Mr. Angus' amateur experience extends back some fifteen years, well before the war. He is our Section Communications Manager for Indiana, past President of the Indianapolis Engineers Club, a Lieutenant-Commander in the U. S. Naval Reserve, and a member of the A. I. E. E. A business man of mature years, he is treasurer and chief engineer of the Esterline-Angus Co., in which capacity he has done much traveling that has brought him in contact with amateurs and clubs around his division. The Central Division is to be congratulated upon its choice.

Strays

W3CJ finds that his spare receiver coils are handy for shifting dead spots on his tuner. The coils are wound on tube bases, and an extra socket is connected in the antenna lead so that when a spare coil is plugged in it, it acts as a loading coil, thus shifting the resonance point of the antenna.

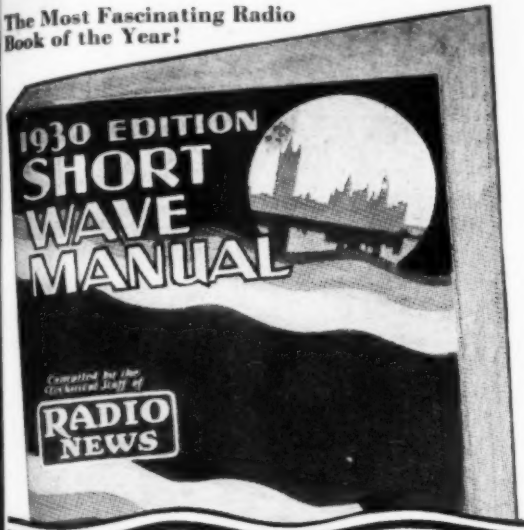
W9CBK has a tuning condenser with plug-in rotor plates, while W8DXG puts the stator plates on plugs. The only thing we lack is a coil with plug-in turns or a tube with a plug-in filament.

From the March issue of *Factory and Industrial Management:* "An editor must have his mail. So when ours failed to put in an appearance the other morning, we were moved to find out why. We found out. Bill, the office boy, had overslept. Bill, we learned, is not only a radio fan, but a licensed operator as well, who sits up all night, most nights, accommodating the world with messages from Byrd and all that sort of thing. Has forgotten more about radio than most of us will ever know. There are lots of boys like Bill scattered around industrial plants these days. Radio owes them plenty. Are we going to stand idly by while the big fellows do their darnedest to crowd these young explorers off the air?"

Good-will of this sort is worth having. Nearly every amateur can do something to help build it.

W1ALJ thinks he should be awarded some sort of medal. He didn't drop a single nut or screw when building his new receiver!

The Most Fascinating Radio Book of the Year!



FREE with the NEW RADIO NEWS

This Big Illustrated Volume Containing All You Want to Know About SHORT WAVES !

BECAUSE you and thousands of other radio men want all the latest facts and developments on Short Wave receiving and transmitting, the Technical Staff of RADIO NEWS in collaboration with the foremost S-W authorities have especially prepared a complete, new, up-to-the-minute SHORT WAVE MANUAL for you.

Replete with illustrations, diagrams, charts and plans — crowded with chapters by Lieut. Wenstrom, Hertzberg, Marshall, Spangenberg, Benneweg and other experts — this volume represents the last word in authentic Short Wave data. You'll be fascinated with such features as: —

- Breaking into Amateur Transmitting
- S-W Transmitter for the Average Home and Purse
- A Portable S-W Transmitter and Multi-wave Receiver
- The A. C. Operated Super-Wasp
- Crystal-Controlled 200 Watt S-W Transmitter
- The Egert S-W Four
- Experiments on Ultra-High Frequencies
- S-W Stations of the World
- For Real Thrills Get Down in the Amateur Wave Bands

In short here's the book that describes, illustrates and explains everything about S-W's — that gives you the complete and latest data. And it's yours WITHOUT COST!

Why It's FREE!

RADIO NEWS has practically twice as many readers as any other radio magazine. But there are still a few of you radio men who don't realize what you are missing.

Do you know that, besides covering every other phase of Radio, RADIO NEWS publishes many exclusive S-W features every month. Every issue keeps you posted on the latest S-W receiving circuits, up-to-the-minute S-W Broadcast Call Lists, S-W Receiver and Transmitter Designs, News from the Amateurs, latest improvements in Portables, etc., etc. You absolutely need RADIO NEWS to keep abreast of all S-W developments.

Big Cash Saving — Gift FREE!

That's why, although we will sell thousands of these SHORT WAVE MANUALS for a substantial price, for a limited time you may have a copy ENTIRELY FREE as an inducement to try RADIO NEWS.

To introduce RADIO NEWS to you, we will send you the next Eleven Big Numbers almost a full year subscription for only $2 — and will ship you the new 1930 SHORT WAVE MANUAL, postpaid, *entirely FREE!* You save 75c on the newsstand price of RADIO NEWS and get this invaluable S-W volume WITHOUT COST! Risk nothing. Mail coupon TODAY!

FREE Send for Yours TODAY

The NEW RADIO NEWS, Dept. 312,
381 Fourth Avenue, New York, N. Y.

Gentlemen: Send me, ENTIRELY FREE, postpaid, the new 1930 SHORT WAVE MANUAL, and enter my subscription for the next Eleven Big Issues of RADIO NEWS at only $2 which I enclose (regular newsstand price $2.75). I understand you will cheerfully refund me $2 and I may keep the S-W MANUAL if I am not more than satisfied.

Name .....

Address .....

City and State .....

Are you a Serviceman ☐? Engineer ☐? Dealer ☐?
Experimenter ☐?

You Can't Duplicate Guesses

The Audimeter An audibility gauge for the amateur. Do you always give the same R5? What about on two audios? What about during a noisy spell? This little panel-mounting Audimeter gives the right reading and the same one on two A.F. as on one tube, during QRM and QRN, and will repeat itself. You can't duplicate guesses. Invaluable during tests if decently accurate reports are to be made. It not only ends the guessing but it makes guesses absurd because the price is too low to justify anybody's being satisfied with a guess. Calibrated with 5 arbitrary points and with the half-points marked. Has a handsome aluminum dial, is single-hole mount and a pointer-knob gives the indications. Serves also as volume control. Get the story — for the guesser is going out of date in amateur radio. Write today or order. Price $2.80 to the amateur.

The Hy-7 L. W. Hatry's latest double-detection design. A six-tube receiver with three screen-grid tubes. The complete story on how to make it and why — 50c. Write for descriptive circular. Band spreading if you want it. A real short-wave set.

The Voltma High-resistance (1000 ohms per volt) voltmeter and any milliammeter range you want combined. Low price. 1500v. and 500 ma. combination $9.75. Name combination and get quotation or write for information.

Jewell, Weston, Cardwell, Electrad, Sangamo, Tobe, Thordarson, Yaxley, National, Frost, Pilot, Signal, Hammarlund, Clarostat, etc., at amateur prices. And we help — we answer questions.

Hatry & Young

119 Ann St. H Y Phone 5-2733

HARTFORD - CONNECTICUT - U.S.A.

THERES THE GREATEST RECTIFIER ON THE RADIO MARKET TO-DAY- AND IF A BETTER TUBE CAN BE MADE- THEN THE NATIONAL RADIO TUBE CO., MAKES IT...
THE WORLD

Say It with Recto Bulbs

Type R3 $10.00 Type R81 $7.00

NATIONAL RADIO TUBE CO.
3420-18TH ST. S.F.

Dealers

CHI-RAD, CHICAGO LEEDS, N. Y.
HENRY'S RADIO SHOP, BUTLER, MO.

Doings at Headquarters

SOME changes have been made in the personnel at headquarters since the last "Doings" were published. Included is the arrival of Mr. Clinton B. DeSoto, W9KL, from Middleton, Wisconsin, who has hooked up with us in the capacity of Assistant to the Secretary, which title Mr. A. L. Budlong relinquishes to become Assistant Secretary.

Mrs. Winston Abbott, *née* Dorothy Menk, none other than DEM of Communications Department fame, has a permanent schedule now. The wedding was held April 12th with FEH and EV among those present.

W1SZ has changed location again. The station is located now in the State Armory at Hartford.

Nearly every member of the Hq. Staff dropped in at the New England Division Convention in late April at Worcester, Mass., at one time or another. The week before the convention Fred Schnell, former Traffic Manager, was the guest of K. B. Warner. "FS" had his golf outfit in tow. Nuff sed!

D. H. Houghton, *QST*'s Circulation Manager, has left for a three weeks' business tour of the east, and middle west, checking up on *QST* distribution. Ralph Beaudin is holding down the department in Dave's absence.

F. E. Handy is attending the Midwest Division Convention.

How the mighty have fallen! We cannot keep the news any longer. James Joseph Lamb, Technical Editor of *QST*, was married on May 5th to Miss Josephine Gleason in Hartford. The couple left for the great open spaces following the wedding and Mr. Lamb is booked to turn up at the Midwest Division Convention.

Considerable interest is being shown at Hq. in the coming 28-mc. tests in June.

— *C. C. R.*

Silent Keys

It is with deep regret that we record the passing of these amateurs:

Ernest R. Hood, Cambridge, Mass., W1AOW.
George G. Goode, Centerview, Mo., W9GBT.
Charles S. Taylor, Buffalo, N. Y., W8PJ.
Carl E. Trube, Yonkers, N. Y., Ex-2BK.
LeRoy A. Dey, Osborne, Kans., W9CNT.

Strays

PAOOOOOOOQF is reported in a recent list of calls heard. We'll bet that station doesn't sign very often! Or maybe the reporter's typewriter stuttered.